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ABSTRACT

This booklet outlines a framework for defining and measuring equity in state school finance and tax structures. The framework focuses on two groups: children, who receive educational services, and taxpayers, who pay for those services. Discussed are the different measures of equity for children and taxpayers, the values inherent in those measures, and their statistical properties. Also discussed are the status of equalization among the 50 states and the impacts of special adjustments. An extensive appendix explains formulas used and offers a state-by-state equity analysis. The booklet is useful for presenting a framework for sorting out the many policy goals for state school finance structures, for developing a set of terms that can lead to a common financial language, and for measuring the degree of equity in the 50 state school finance and tax structures. (Author/LD)

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Equity in School Finance

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Report No. F79-9

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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STATE OF MICHIGAN

OFFICE OF THE GOVERNOR

LANSING

WILLIAM G. MILLIKEN
GOVERNOR

October, 1979

During the past decade, school finance has been a priority issue throughout the United States. In that time a number of alternatives have been explored to improve public funding of education, but there has not been an adequate process for measuring attainment of the respective goals for state policy or comparable standards among the states.

This paper represents a major contribution to our capacity to judge the merits of the different approaches being used throughout the country.

The goals set by each state differ of course, and each state should be measured on its goals and its progress as well as how it compares with other states. In that context, this paper offers a practical and realistic step forward in the development of a rational framework for equity in school finance. I hope you will find it challenging and informative.

William G. Milliken

Governor

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Executive Summary

This booklet outlines a framework for defining and measuring equity in state school finance and tax structures. The framework focuses on two groups: children, who receive educational services, and taxpayers, who pay for those services. For children, the framework states that the distribution of three different classes of objects could be of interest: (1) inputs such as revenues, expenditures or programs and services; (2) outputs such as achievement test scores; and (3) outcomes such as adult income or occupational status. Three equity principles for children are outlined: (1) equal treatment of equals which assumes all children are alike and focuses attention on the basic education program; (2) unequal treatment of unequals which recognizes differences such as physical handicaps or low achievement; and (3) equal opportunity or nondiscrimination according to categories such as wealth and income. Different measures of equity, the values inherent in them, and their statistical properties are also assessed.

For taxpayers, the distribution of two groups of objects are discussed: (1) taxes only and (2) taxes plus education services. Various principles for assessing the distribution of these objects as well as various measures to quantify the distribution are also discussed.

In Section III, the booklet presents four different measures that indicate the degree of equity in the distribution of current operating state and local revenues per pupil within nearly all 50 states for the 1975-76 school year. Two measures are given for the relationship between revenues per pupil and property wealth per pupil for about 20 states. These measures are also given for the same states for selected years between 1972-73 and 1975-76 to give an indication of the change over time and the impact of school finance reforms. This section concludes that both the measure selected and the policy issue considered can lead to different conclusions about the equity of a state's education finance system.

This section also presents the tax burden as a percent of current income for all state and local taxes, and for the local property tax, by 14 income classes for all 50 states, under both the conventional and new views of tax incidence. The results show severe regressivity for the property tax, significant regressivity for the total state and local tax burden at the bottom and top incomes ranges, but propor-

tionality or near proportionality for the total tax burden across the middle income ranges in many states. The results show that both the tax burden for any one income class and the degree of regressivity or proportionality varies considerably among the 50 states.

The booklet is useful both in presenting a framework for sorting out the many policy goals for state school finanace structures, for developing a set of terms that can lead to a common language for discussing school finance issues, and for making a first attempt to measure the degree of equity in the 50 state school finance and tax structures.

Introduction

Defining and measuring equity in state school finance structures is long overdue. Local, state and federal officials want clear definitions of the many different equity goals in school finance; and they want to know where states stand with respect to these different equity objectives. In addition, during the 1970s interest in knowing the impact of new school finance legislation has grown. The burning question is whether the numerous school finance reforms that have been enacted during the 1970s have enhanced progress towards equity objectives; specifically, how much progress has been made towards which equity targets with what kinds of new school financing systems? Finally, there is growing concern about the interaction between categorical funds for specific programs and general aid allocated for equalization goals. Are the two compatible; and if so, to what degree and under what conditions?

Equity in school finance, specifically the term "equalization," is used loosely in policy discussions. The two words cover many diverse, and at times conflicting, goals of a school finance policy. There is a pressing national need for a coherent explanation of what is implied by equity in school finance in order that the discussion of various alternative policies, the evaluation of the impacts of reform programs and the determination of the status of the states on school finance equity can proceed in a more straightforward manner.

Such a framework should be organized around possible answers to four questions that constitute the outline of alternative equity objectives. The first answers the question: Equity for whom? The two groups of primary interest are children, who attend the schools, and taxpayers, who pay for the schools. The second question is: Equity of what? For children that could mean a fair distribution of expenditures per pupil, a fair distribution of school services, equal achievement test scores or equitable lifetime incomes. For taxpayers it could mean fair school property taxes, or fair total property taxes or a progressive overall state/local tax system or many other tax objectives. For either taxpayers or children, the answer to the question of "what is to be fair?" is pivotal to conclusions that can be drawn about the equity of the system. Finally, there are different equity principles that can be applied and different statistical tests that can be used to measure the degree of equity. Both the selection of a principle and the statistic will affect conclusions about the equity of the

system. In short, in defining equity in school finance, the group, the object, the principle and the statistic must be selected in order to define one particular equity goal and measure its status. Section I presents a more detailed description of a conceptual framework for defining equity in school finance.

The development of a systematic equity framework can also provide a common language to be used by policy makers and scholars in discussing equity goals for a school finance program. Currently, words and terms related to school finance are used inconsistently and without commonly accepted meanings. Second only to the need for a comprehensive framework for equity in school finance is the need for a common language to diminish confusion, avoid misunderstandings and focus policy discussions on the substance of values and choices rather than semantics.

The need for definition and measurement of alternative equity goals in school finance is not a new one. School finance scholars and policy makers have for years attempted to give clear definitions to the various equity issues in school financing policies. During the 1970s, moreover, courts in many states have become centrally involved in defining constitutionally acceptable school finance standards. Indeed, the court standards have become diverse and complex over the 10 years during which school finance policies have been litigated.* Even legal definitions of school finance equity have been unclear, however, allowing flexibility as well as controversy over new policies that might meet a court order.

The absence of clear statements of school finance equity standards was keenly felt during the September 1977 hearings on H.B. 131, a bill introduced by the Honorable Carl Perkins to provide for a federal role in school finance equalization. During those hearings it was clear that many who testified used similar terms to describe very different policy goals and that no one could point to research that showed the status of equity in school finance, under any definition of equity, among all the 50 states.

An initial response to this lack of information was an informal gathering by a number of school finance scholars and policy makers in October 1977 for the purposes of making headway on defining

*See John Augenblick, *School Finance Reform in the States: 1979*, Denver, Colo.: Education Finance Center, Education Commission of the States, 1979, specifically Chapter 2 authored by Betsy Levin, for an overview of the various school finance equity standards developed in recent school finance litigation.

equity in school finance and measuring the status of the states on different equity goals. This meeting launched what became known as the School Finance Cooperative. A second response by the Congress was certain provisions in H.R. 15 which mandate a three-year study of school finance to be conducted by the Department of Health, Education and Welfare (HEW). More specifically, the bill requires the National Center for Education Statistics (NCES) tc produce, beginning in 1979, biennial profiles of school finance systems both within and among the states.

The School Finance Cooperative* (Figure 1) first met in Chicago in November 1977 to discuss what it could do to define and measure equity in school finance among the states. Its long-term goal was to narrow the differences between and among the academic and policy communities, to develop a common language for discussing school finance equity, and to have NCES assume the responsibility for periodically reporting on the status of state school finance systems. At the Chicago meeting, however, the Cooperative decided that as a first step it should attempt to develop a comprehensive framework of equity in school finance and to pool the data available among its members both to conduct some research on methodological issues related to measuring equity and to assess the degree of equity and change in equity over time in the states for which data were available.

The Cooperative met again in July 1978 with additional representatives from the Council of Chief State School Officers, the National Governors Association, the U.S. Office of Education, the National Education Association and the American Federation of Teachers. At this meeting the methodological research, discussed in Chapters II and III, was reviewed. The conclusions reached were that the various standards and statistics that can be used to define and measure equity have importantly different properties and that the use of different statistics can lead to different conclusions about the status of equity in a state.

The most recent meeting of the Cooperative was in August 1979, at which time this document was reviewed and critiqued by all of the

*Members of the School Finance Cooperative include the Education Commission of the States, the National Conference of State Legislatures, the Rand Corporation, the Educational Policy Research Institute of the Educational Testing Service, the Lawyers Committee for Civil Rights Under Law, the Intercultural Development Research Association, and scholars from New York University, the University of California at Berkeley, Rochester University and Illinois State University. Also invited to the Chicago conference were representatives from state education departments, NCES, the Congress and the sponsors — the Ford Foundation and the National Institute of Education.

above parties plus representatives of the National Association of State Boards of Education and the American Education Finance Association.

Figure 1

The School Finance Cooperative: Groups and Persons Contributing Data

Education Commission of the States Education Finance Center Allan Odden, John Augenblick	Contributed data for Arizona, Arkansas, Colorado, Delaware, Idaho, Indiana, Kentucky, Minnesota, Missouri, Nebraska, New York, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Virginia, Washington, Wisconsin and Wyoming.
Education Policy Research Institute Educational Testing Service Jay Moskowitz, Margaret Goertz	Contributed data for Connecticut, New Hampshire, New Jersey, New York and Vermont.
Intercultural Development Research Association Robert Brischetto University of Rochester Walter Garms	Contributed data for Florida, New Mexico and Texas.
Illinois State University G. Alan Hickrod	Contributed data for Illinois.
Lawyers Committee for Civil Rights Joel Sherman	Contributed data for Alabama, Georgia, Louisiana, Massachusetts, Mississippi, North Carolina, South Carolina and West Virginia.
National Conference of State Legislatures Legislators' Education Action Project William Wilken	Contributed data for Kansas, Maine, Massachusetts and West Virginia.
New York University Robert Berne, Leanna Stiefel	Contributed data for Maryland.
The Rand Corporation Stephen Carroll	Contributed data for California and Michigan.

This document constitutes the first comprehensive statement on defining equity in school finance and measuring the status of equity among the states under a few select equity goals. In interpreting the results presented in the booklet, one needs to remember that states have different policy objectives for their school finance and tax structures. The statistics given in this report, however, assess the

equity of the state systems irrespective of whether a particular state's goals are necessarily consistent with all the equity tests presented. This type of procedure is necessary in order to use a system to assess the equity of all state school finance systems under different equity objectives. This means that a careful interpretation of the statistical results presented in this report is required in order to make accurate conclusions about individual states.

The results are based on data from all school districts in each state. The publication of this document constitutes the completion of the Cooperative's initial program of work. Further work of the Cooperative may include additional development of the equity framework, more work on the methodological issues of measurement, a more comprehensive analysis of the status of equity among the states using new data, or other work as the situation warrants.

I. School Finance Equity

School financing has been one of the most active policy issues in the states during the 1970s. Indeed, over half the states have enacted reforms in their school financing systems and still others are currently debating changes in how elementary and secondary public schools are financed (Augenblick, 1979). School finance equalization has become a key element for education reformers and progressively-oriented state policy makers who want to make their education systems more equitable.

Equalization and equity in school finance have different meanings for different people, and in the latter half of the 1970s this lack of clarity has become problematic. While equity for some means property tax relief, equity for others means equalizing schooling resources. These two objectives are quite different and it is not clear how policies implemented to produce one objective affect the other.

There will always be a variety of policy objectives surrounding school financing policies. But there is a need for a framework that can provide order to and understanding of the various policy objectives and equity goals in school finance. Who are the different groups for which school finance systems should be equitable? What should be distributed fairly for the different groups? What are different principles for assessing whether the distribution is equitable? And what statistical tools can be used to measure the degree of equity? A systematic array of possible answers to these four questions will provide a broad framework for sorting out the various policy goals in school finance and allowing policy makers to be precise about different meanings of school finance equity.

In addition to making policy goals clearer in school finance, there are other factors that support the need for an equity framework. A good equity framework can provide a common language to be used in discussing school finance policies. Neither school finance scholars nor state policy makers use terms, equity principles or statistical measures similarly in discussing school finance issues. The result is that it is difficult to make comparisons across states on the basis of the numerous school finance evaluations that have been undertaken. It is also the case that evaluation of the performance of any single state over time requires a consistent framework. A good equity framework can be used to formulate these assessments

which, if common conceptual outlines and procedures are used, can produce information useful to all states. Finally, the federal government is again thinking about alternative federal general aid proposals and the impact on categorical programs of inter- and intrastate expenditure disparities. The development of such policy alternatives requires a systematic understanding of the status of equalization within and among the states. Such knowledge mandates the use of a rigorous equity framework in order to make valid comparisons both across states and within states over time.

In short, there are many reasons for developing a comprehensive equity framework for school finance and for using that framework to assess the degree of equity in school finance within and across the states. While the framework presented in this section is not based solely on the standards set out in various court cases, it has relevance for litigation and can be used in the judicial as well as legislative setting.

In this section, the outlines of the equity framework are given. In Section II the methodological issues related to measuring the status of equity are summarized. In Section III an assessment of the degree of equity attained in the states, as well as the degree of progress in some states over time, are given. Section IV discusses the importance of adjustments to simple equity tests; in particular, adjustments for pupil need and cost differences are analyzed. In the last section the environment of school finance in the 1980s is discussed in relation to its impact on attaining more equitable school financing in the next decade.

Alternative Concepts of Equity in School Finance

Equity is difficult to define. It means being fair, providing equal opportunity, or allocating equal shares to all. But exactly what does this mean? In developing a school finance system, choices must be made among various elements of school finance programs. The choices embody specific concepts or goals of equity. In certain instances some of these goals may not be simultaneously attainable in the real world, i.e., they may be mutually exclusive. To build an equity framework that can sort out these problems and give clarity to various equity goals, four practical questions must be answered:

1. Equity for whom? Taxpayers, children, teachers, etc.?
2. What services or resources should be distributed fairly for these groups?
3. What are the different equity principles that can be used to determine whether the distribution is fair?
4. How should the degree of equity be measured?

Equity for whom?

The two traditional choices are children, who receive education services, and taxpayers, who both receive education services for their children and pay for schools through taxes.

Why are children targets for equity? There are numerous reasons but two are paramount. First, education is viewed as one of the major keys to an individual child's future. It is therefore a public service that should be delivered equitably to all. Second, education enhances the nation's human capital and socializes its citizens. All children should be treated fairly in that process. Choosing children as the target group for equity is justified as having both individual and societal benefits.

The major reason for choosing taxpayers as the equity target is that equity in school finance also applies to those who pay for education services. The nexus between taxpayers and education financing has always been recognized. In the school finance reforms of the 1970s, the choice of taxpayers as the group for whom equity was sought can be seen by the linkage that formed between school finance reform and property tax reform. The taxpayer focus is also useful since it can be expanded and viewed more broadly in terms of a household unit. With a household unit, equity concerns can apply to education taxes paid by and education services received by the household. The household unit can be used to enlarge the scope of the equity conception even further by including all resources available in the household for education, not just schooling.

The two answers to the question "Equity for whom?" naturally divide the conceptual framework. In the remainder of this section, the equity framework with children as the target group is examined, followed by consideration of equity with taxpayers as the group.

Equity for Children

There are numerous things that could be distributed equitably among school children. In fact, one of the most difficult and important decisions that must be made in assessing the equity of a school finance system is the object or objects that a policy maker wants to have distributed fairly. One can divide objects related to children into three general categories: inputs, outputs and outcomes.

Child input concerns. Inputs are the resources or services provided by the school system. In the first instance, these could be defined as revenues or expenditures per child. This has been the standard object many people want distributed equitably among school children. But even at this simple level, a number of decisions need to be made.

First, should revenues from all sources — local, state and federal — be considered in assessing the state school finance system? Or should federal revenues be excluded and should analysis be made of revenues or expenditures from just state and local sources? While there is much interest in the distribution of federal education dollars, most of those funds are targeted on specific categories of children and the legislation intends that they be spent for clearly identified programs. In almost all instances, moreover, state policy makers have little control over the distribution of federal funds. Except for impact aid, especially when it is considered in allocating state general aid, it is becoming common practice to drop federal revenues in assessing the equity of state school finance systems and that is what has been done in the analyses presented later in this booklet.

This decision does not imply, however, that federal funds should be ignored in analyzing education financing across the country. Indeed, the current HEW study of school financing should pay particular attention to the federal role in school finance equalization, including both the impacts of the federal categorical dollars and potential impacts of a federal general aid policy.

Even without federal revenues, there are still many expenditure figures that could be used. The initial choice is between total expenditures (or revenues) per pupil from state and local sources or just current operating expenditures (or revenues), i.e., total expenditures (or revenues) minus expenditures for capital outlay and debt service. While most attention has been given to current operating expenditures, increased attention is being given to the capital budget and the equalization issues related to it. Both should be investigated.

Other expenditures or revenue figures could also be selected. One could argue that transportation and even operating and maintenance expenditures should be excluded from the figure analyzed, in order to focus more clearly on the distribution of expenditures most closely related to school or educational services. Since most states compile an instruction expenditure per pupil figure, this could be the figure used. While instruction expenditures exclude all central district administration and other services, they include most services provided at the school building level. Within the instruction expenditure category, moreover, one could choose just expenditures for classroom teachers, thus targeting interest only on services provided to children in the classroom. Indeed, this type of input measure could approximate the basic education services provided to children in a school district. But this narrow expenditure figure would exclude expenditures for books, materials and supplies, expendi-

tures on pupil support services and expenditures for classroom teacher aides.

In addition to, or instead of selecting an expenditure figure for analysis of school finance equity on the input side, measures of actual services could be used. For example, pupil-teacher ratios, or the number of certified professional staff per 1,000 students could be used. This type of figure could be augmented by numbers of books per 1,000 students and numbers of noncertificated staff per 1,000 students. Here again, the gross figure of total professional staff could be subdivided, and analysis could be made of the number of teachers, number of pupil support staff and number of administrators per 1,000 students. In some states, it would be possible to devise information giving more detail on the breadth of the education program, an even better description of how dollars are translated into education programs for children. Of course, for all definitions of services provided, information on the quality of the services also would be desirable, such as the education and experience of the staff, the type of curricular program, etc.

The distinguishing point of the above items is that they go beyond the raw dollars that are available and provide some indication of how dollars are spent to provide different kinds of educational services to children. While such measures might be preferred to dollar or expenditure figures, the problem is that they are hard to obtain and simply unavailable in many instances.

Regardless of whether an expenditure or service figure is used, the above discussion indicates that within each category there are numerous figures from which to choose. And most importantly, the selection of a particular figure may have a significant impact on judgments made on the equity of the school finance system.

In this booklet, all state and local revenues per pupil for current operating purposes is the variable analyzed. More specifically, federal revenues are excluded; all revenues for debt service and capital are also excluded. Since the sources of our data are state level sources, the exact same revenue definition is not attainable for all states. However, the differences in the data definitions across states are minor and will not affect our substantive conclusions. For each state the same revenue definition is utilized over time. The data used in the research for this booklet are discussed more fully in Appendix A.

An additional concern related to both an expenditure or service input object is whether to make adjustments for special school district or pupil need issues. As an example of the former, prices for education resources differ across school districts and regions. The

purchasing power of the dollar is not equal from district to district. If cost-of-education indices were available, it would be desirable to adjust all revenue and expenditure variables to produce a real as compared to a nominal figure on which the analysis would be based. Real cost-adjusted expenditures would be closer to resources. Pupil adjustments relate to varying pupil needs, how to define them and how to make adjustments to reflect the differences that exist from district to district. Both of these issues are discussed more fully in Section IV.

Child output concerns. Some argue that the results of the schooling system are what should be distributed fairly among children. Results could include achievement test scores, mastery of competency levels in different subject areas, passing of minimal competency tests, high school graduation, or numerous other measures of a student's behavior at the end of high school or other identified grade levels. Indeed, current litigation trends in some states indicate that the state has affirmative duties to insure student achievement at least at minimum levels. Without going into further detail, the point of this perspective is that student behavior could be the item of interest, not just resources or services provided on the input side.

Child outcome concerns. Some argue that the perspective should be longer term than just the immediate results of the schooling system, and that lifetime outcomes such as income, occupational status, personal satisfaction, ability to compete in the labor market or status in life should be the object of interest. While such a perspective may be asking too much of the schooling process or the education financing system, it does raise the issue of how such lifetime outcomes, which reflect the ultimate position of a child in adult society, are affected by the public education financing system. This booklet does not make any attempts to make these links in assessing the equity of state school financing systems. But links do exist and should not be ignored totally in future scholarly work on school finance equity.*

Children's Equity Principles

The above discussion indicates that there are numerous objects that can be considered in assessing whether the school financing system is fair to children. But when a particular object such as current operating expenditures per pupil is selected, one must then apply an equity principle in order to make conclusions on whether the object is distributed fairly. There are three general equity principles that

*See, for example, Levin (1979) for a conceptual framework of how relationships between school financing and outcomes could be formed. Empirical testing of the theory should be available from Levin in late 1979.

can be used in assessing whether any of the above objects are distributed fairly for children.

Equal treatment of equals. This principle states that students who are alike should receive equal shares. Equity is assessed by measuring the dispersion or inequality in the distribution of objects; no dispersion is perfect equity. Very often in school finance for purposes of equity analysis, all students in a state are treated as if they were equal. When children are so treated, this principle would require, in terms of the objects considered above, equal expenditures or revenues per pupil, equal education resources for the basic education program, equal pupil-teacher ratios, mastery of competency levels, or equal long-term outcomes such as income or status in life.

Unequal treatment of unequals. While the above principle is applicable when children are alike, the second principle recognizes that students are different and states the positive requirement that unequals receive appropriately unequal treatment. Both the specification of "legitimate" differences, and the nature and extent of the appropriate unequal treatment, must be selected; these choices are based largely on values. While there is bound to be controversy surrounding any identification of "differences" in school finance, children with handicapping conditions, poverty background and limited English speaking ability are usually recognized as deserving unequal treatment. Often, particular school district characteristics, such as size and sparsity, for example, are also recognized as legitimate means for differential treatment. Other differences such as minority status or geographic (urban-rural) setting can be included in this principle, but they tend to be more controversial. In terms of the above objects, this principles would require a different level of resources for the special pupil populations or district characteristics.

Although it is easy to recognize differences among children, it is more difficult to determine the ways these differences should be handled in making assessments on the equity of the system. If there were good information on the program costs of extra services for these special pupil populations, and some specifications of levels of achievement expected for the special population groups, a weight could be derived indicating the extra cost of a particular program in relation to the basic programs. If each student were then weighted to reflect these program cost differences, analyses could be done on revenues, expenditures or services per weighted pupil. An analysis using weighted pupils, in effect, combines the equal treatment of equals and unequal treatment of unequals principles into a single assessment of equity.

Alternatively, all revenues, expenditures or programs for these spe-

cial purposes could be eliminated and an analysis made of the equity of the distribution of just the basic education program. Of course, this solution skirts the issue of how much additional is required for these groups, whether the actual extra expenditures or services are sufficient, whether the categorical funds are actually spent on special pupil populations and whether districts spend noncategorical funds on special pupils. An analysis that eliminates the objects for special pupils in effect eliminates any real assessment of the unequal treatment of unequals. It may, however, improve the assessment of the equal treatment of equals.

A third way to account for pupil differences is to calculate the share of total revenues, expenditures or services received by the various special populations as well as by the regular student populations. This assessment is a more direct way to judge the unequal treatment of unequals, but difficult judgments about the desired shares must be made. Regardless of the method selected, the unequal treatment of unequals principle requires that student differences be recognized and accounted for in a comprehensive assessment of the equity of the overall system.

Equal opportunity. The third principle incorporates concepts of equal opportunity or nondiscrimination. The equal opportunity principle can be formulated as a negative principle; there should not be differences according to characteristics that are considered "illegitimate" (or unconstitutional) such as property wealth per pupil, household income, fiscal capacity or sex. For example, this principle would require that there be no relationship between expenditures, resources, programs or outcomes and per pupil wealth or fiscal capacity. This example illustrates one way of implementing fiscal or wealth neutrality, where the general fiscal or wealth neutrality concept states that education should not be a function of local wealth. When fiscal or wealth neutrality is formulated as the absence of an observed relationship between education revenues or resources and local wealth or fiscal capacity, as it is in this example, it is commonly termed *ex post* fiscal or wealth neutrality, since the concept is measured after spending decisions have been made by the local districts.* Other forms of fiscal or wealth neutrality are discussed below when equity is viewed from the taxpayer perspective.

Equity for Taxpayers

While numerous equity concepts can be developed when children are the group of concern, taxpayers are another group that can be

*For a fuller discussion of alternative concepts of fiscal or wealth neutrality, including the *ex post* and *ex ante* issues, see Barro (1974), Feldstein (1975), and Friedman and Wiseman (1978).

treated equitably or inequitably by a school finance system. In many ways equity from the taxpayers' perspective is more complex than from children's. Moreover, the conceptual framework is not as well developed on the taxpayers' side. With these cautions in mind, certain characteristics of equity from a taxpayers' perspective can be set out.

There are numerous objects of concern for taxpayers, just as there were numerous objects for children. In this section, two taxpayer objects are considered. First, tax burdens on taxpayers are examined and second, taxes paid and benefits received by the taxpayer are treated.

Tax burdens. Tax burdens can be defined as the taxes paid by taxpayers, usually stated as a percentage of the taxpayers' ability to pay. For example, taxes as a percentage of income is a common tax burden measure. Despite this relatively straightforward definition of tax burdens, there are many complicated technical and conceptual issues related to this object. The first is whether tax burdens on school districts or individuals should be the concern. The second is whether education taxes or taxes for all public services should be analyzed. Education taxes could be distributed fairly, while total taxes were not, and vice versa. The third is whether local taxes, or state taxes, or the combination of the two should be considered. Again, the choice would have important implications for assessments on the equity of the tax burden. A fourth concern is whether legal tax incidence or economic tax incidence should be analyzed. It is fairly straightforward to identify legal tax incidence, i.e., those who actually pay the tax to a government. But sometimes tax burdens can be shifted, i.e., a landlord can (under some circumstances) shift the real tax burden to a tenant in the form of a higher rent. Economic tax incidence accounts for such shifting, but the actual degree of shifting, as well as the group to whom the tax is shifted, is now debated for most taxes. Nevertheless, legal tax incidence and economic tax incidence will give quite different pictures of the burden of the tax system. Finally, if tax incidence is related to ability to pay, there are choices to be made on what ability to pay measure should be used: current or lifetime income, income from salaries and returns from investments, transfer payments such as social security and imputed income such as for work around the house.

While research can guide choices on each of these issues, many of the choices are value judgments where there is no right or wrong choice. Thus, on the taxpayer as well as the children's side of equity, the choice of an object is neither straightforward nor value free.

Taxes paid and education received. One characteristic of just the

tax burden issue is that it ignores the education services that the taxes support. Since taxpayers themselves do not directly receive education services, the taxpayer group can be broadened to include the entire taxpaying unit, i.e., the household. With the household as the unit, the object can include education services received by the children in the household and taxes paid by the taxpayers in the household. Of course, the use of this object requires choices to be made both for children's objects as well as for tax burden objects. Furthermore, the consideration of the household as the group raises the difficult question of how to treat households with varying numbers of children (including none). In the next part, only a few principles that utilize taxpayer objects are considered. Given the large number of potential objects and principles, these should be considered examples.

Taxpayer Equity Principles

The choice of a taxpayer object is basically between a tax only approach or a combination tax and education service approach. In order to present examples of taxpayer equity principles, principles that apply to these two objects have been selected. First, tax burden equity principles are discussed, followed by principles that combine taxes paid with services received.

Tax burden equity principles. With tax burden as the object, there are two equity principles that can be applied. The first is horizontal equity, expressed as equal tax burdens for taxpayers with equal ability to pay. If horizontal tax equity is assessed within a district, equity can be violated by inconsistencies in assessment (or equalization) practices. Horizontal tax burdens can also be examined for taxpayers with the same ability to pay who reside in different districts. However, before this issue is addressed, the question of whether horizontal tax burdens among districts is an appropriate issue should be raised. Equal tax burdens for all taxpayers with the same ability to pay may not make sense across districts, where education services for the taxpayers' children vary considerably.

The second tax burden principle is vertical equity which examines the relationship among tax burdens by varying levels of ability to pay. When tax burdens are assessed in this manner they may be regressive, proportional or progressive. A regressive tax burden decreases with higher ability to pay, proportional tax burdens are constant over all ranges of ability to pay, while progressive tax burdens increase with increasing ability to pay. The choice of the degree of regressivity or progressivity is another value judgment, although most people agree that a proportional or progressive tax burden is preferable. As was the case for horizontal equity, vertical equity can be examined within or among districts.

Equity principles for taxes paid and education services received. When the object for taxpayers is expanded to include taxes paid and education services received, a diverse set of principles can be articulated. For example, both the horizontal and vertical equity principles can be reformulated with education received, net of taxes paid, as the object. However, in school finance there are other principles that apply to this object.

One principle that takes taxes paid and education received into account is the "equal yield for equal effort" principle. This principle is satisfied when increments in per pupil education services (revenues, expenditures, resources, etc.) that result from an increment in the property tax rate are equal across districts. A different way of stating this principle is that when complete equal yield for equal effort prevails, school districts that tax themselves at the same rate receive equal amounts for each student. The equal yield for equal effort principle is another way of measuring fiscal or wealth neutrality. This is an *ex ante* fiscal or wealth neutrality principle, since it depends on how the formula is structured rather than on what districts actually spend. [Recall that the observed relationship between education (revenues, expenditures, wealth) and wealth was an *ex post* measure of fiscal or wealth neutrality.]

A second equity principle that combines taxes paid and education received is similar to the equal yield for equal effort principle but is based on a broader measure of ability to pay, rather than just the property base. A statement of the principle is as follows: equity is reached when the distribution of the object (education services) is determined solely by the preferences of the taxpayers for education, and not by their ability to pay, as measured by wealth, income or some broader variable. The methodological and conceptual issues surrounding the measurement of ability to pay, and the separation of ability to pay from preferences are not yet resolved to the point where this principle is commonly found in school finance analyses, but it is a conceptually sound principle nevertheless.

Conclusions

The equity framework for school finance outlined in this section can be used to organize thoughts and policy goals related to school finance equity. Choices must be made about the groups of concern — children and taxpayers, the legitimate and illegitimate distinctions among them, the objects of concern, the equity principles to be applied and statistical measures of these principles which are treated in the next section. All these have to be addressed by governors, legislatures and educators as school finance policies are forged. Many choices are primarily value judgments, while others can be

made based on careful research and analysis. Foremost among the choices that revolve around values is the selection of the equity goals. Research can inform these choices, but value-laden questions of goals are not appropriate concerns for researchers alone. What research can do is contribute to the ability of policy makers to measure the alternative equity goals with available data and to evaluate the movement toward or away from them.

II. Measurement Issues

After choosing the group of interest, the object of concern and the the equity principle, the remaining issue is how to measure equity; this involves choosing the statistics that quantify the degree of equity or inequity. These choices are also value laden. In school finance there are many statistics that could be used to measure equity or inequity for any of the objects and any of the principles for either children or taxpayers; each statistic has different characteristics.* Usually, different statistics lead to different conclusions about the degree of equity or inequity of the system.** In this section, statistics that can measure two children's equity principles are described and a subset of these measures are chosen for the analyses contained in Section III. Since the taxpayer measures are not as well developed, several characteristics of tax burdens are presented that fall somewhat short of statistics that measure taxpayer equity principles, yet provide the basic data that can be used to assess tax burden equity principles.***

Children's Equity Measures

In this part, statistics that can be used to measure two children's equity principles are presented. First, dispersion measures that assess the equal treatment of equals principle are examined in some detail. Next, several statistics that assess the equal opportunity principle, specifically the relationship between revenues and wealth, are described. No assessment is made of the unequal treatment of unequals principle for children. In Section IV, however, the sensitivity of the measures presented to adjustments for varying pupil need is evaluated. In particular, changes in the value of the statistics are analyzed when a weighted pupil count is used to reflect

*For equity analyses in school finance that employ alternative statistics, see Brown et al., 1978; Carroll, 1979; Friedman and Wiseman, 1978; and Hickrod et al., 1979.

**For an extensive discussion of measurement issues in school finance equity analysis, see Berne and Stiefel, 1978a, 1978b and 1979a.

***For an example of a vertical tax burden measure, see Suits, 1977.

different program costs and when categorical revenues are excluded' from the revenue figure.*

Before discussing children's equity measures, a brief comment should be made on the unit of analysis. Conceptually, per pupil data could be available at the individual pupil level, i.e., actual revenues or expenditures on each individual pupil. On the practical side, only district level data are available and these are used in Section III when the children's equity measures are computed. Thus, state and local revenues per pupil in each district are computed by dividing the total state and local revenues in the district by the total number of pupils in the district. In effect it is assumed for state level analyses that the same amount is spent on all pupils in any district.

Even with district level data, however, the equity measures can be computed using one observation for each district, i.e., the district as the unit of analysis, or by weighting each district by the number of pupils in the district, i.e., the pupil as the unit of analysis. It is the latter procedure that is used throughout this report. Such weighted measures take districts with more pupils into account more heavily and this procedure is viewed as preferable by many school finance analysts, including the authors of this study. This choice is recognized as a value judgment and the conclusions can vary when this weighted approach is not used. (Berne and Stiefel, 1978a).

Measures of the Equal Treatment of Equals Principle

The measures of the equal treatment of equals principle are statistics that assess the dispersion or spread in a distribution. Perfect equity would exist when every pupil in the distribution receives the same object (revenues, expenditures, resources, etc.). Each statistic below assesses how far the distribution is from perfect equality. Research in school finance and other areas such as studies of income distribution has led to the development of many alternative "dispersion" measures. Since different statistics can lead to different conclusions, care must be taken in the selection of a dispersion measure.

Each of the following measures has been used in at least one analysis of equity in school finance:

1. The range — the difference between the highest and the lowest.

*For an additional example of a way to assess the unequal treatment of unequals principle for children, specifically how an education finance structure impacts poor and minority children, see Robert Brischetto, 1979.

2. The restricted range — the difference between the 95th and the 5th percentiles.
3. The federal range ratio — the restricted range divided by the value at the 5th percentile.
4. The relative mean deviation — the absolute value of the sum of the differences of each revenue figure from the mean revenue, as a proportion of total revenue.
5. The McLoone Index — the ratio of the actual revenues of students below the median to the total, if all students were at the median.
6. The variance — the average of the squared deviations of each revenue figure from the mean revenue.
7. The coefficient of variation — the standard deviation divided by the mean.
8. The standard deviation of the logarithms — the square root of the variance of the logarithm of revenues.
9. The Gini coefficient — shows how far the distribution is from providing each percentage of students (e.g., five percent of students) with equal percentages of revenues (e.g., five percent of revenues).
10. The Theil measure — based on the thermodynamic concept of entropy and shows how far each student is from receiving an equal share of revenues.
11. Atkinson's Index — based on the economists' idea of a social welfare function and capable of weighting the bottom end of the distribution as much as desired.

These statistics are different as indicated both by their brief definitions and by the formulas for each statistic as listed in Appendix B, Figure B-1. However, a more useful way to characterize the differences among these measures is to describe the values that are inherent in each. Appendix Figure B-2 lists eight value judgments, stated as questions, and illustrates how each measure incorporates different answers to the questions and, thus, reflects different values. A few of the questions are explained in more detail below in order to give more life to the various values.

Question 1 asks whether all observations in the distribution are included in the measure. In some cases, people's values may prefer the exclusion of some of the pupils. For example, a policy maker who prefers only a minimum foundation school finance program may be concerned only with raising the bottom of the distribution (leveling up), in which case the McLoone Index is a possible measure. Other policy makers may wish to have most of the pupils bunched fairly closely together without being overly concerned by either tail -- the extremes — of the distribution. If so, the federal range ratio is useful. As a final example, a policy maker may want to see no more

than a specific dollar difference between any two children, in which case the range would be an appropriate measure.

Question 3 asks how the measure responds to equal percentage changes in the revenues associated with each child. There are alternative views on how an equity measure should respond to such percentage changes. On the one hand, since there are more revenues to be distributed, some may think that equity has diminished if the dispersion stays relatively the same. The range, variance and restricted range are the only three measures that are consistent with this value judgment because they are the only three that show less equity after equal percentage increases. Others may think that because each child's level has increased by the same percent, each child is as well off in relation to every other child as before and that therefore the equity of the distribution has not changed. The eight remaining measures are all consistent with this second value judgment because they do not change with equal percentage increases. Note that if inflation is uniform, these eight measures will not change with inflation, i.e., they are "inflation proof."

Finally, Question 4 asks how the measure changes when a constant amount of revenue is added to each pupil. With a constant dollar increase for each pupil, the differences among the pupils may seem less important. All the measures except the range, restricted range and variance show more equity when a constant absolute amount is added to each pupil.

Given these different values, it is not surprising that the results of an equity analysis depend, in part, on the measure chosen. The differences among the measures can be seen empirically as well as with values. Appendix Figure B-3 shows the Spearman rank correlation coefficients among pairs of nine of the disparity measures when they are used to rank the dispersion in state and local revenues per pupil in 35 states. A Spearman rank correlation of +1 indicates perfect agreement; a Spearman rank correlation of −1, perfect disagreement. Although all of the rank correlations are positive, Figure B-3 indicates that there is substantial disagreement among some of the measures.

With the different values in the measures and the empirical differences among them, it is difficult to argue for the use of a single measure in any analysis. However, since some of the measures contain similar values and some do agree empirically, it is possible to identify groups of measures and then select representatives from each group. Empirical and conceptual research on the dispersion measures allows us to identify four groups of measures. First, the value judgments, especially Questions 3 and 4, isolate the range, restricted range and variance in one group of measures that is sensi-

tive to equal percentage increases and insensitive to equal additions. The McLoone Index, standard deviation of the logarithms and Atkinson's Index (with a high value of E) all weight the low end of the distribution more heavily than the rest of the distribution and thus form the second group. Of the remaining measures, the relative mean deviation, coefficient of variation, Gini coefficient and Theil's measure are insensitive to equal percentage increases and include all the observations and thus can form the third group. This leaves the federal range ratio and since it is the only dispersion measure that is currently utilized in federal school finance laws, it is probably best to keep this measure by itself in a fourth group.

In the next section, one statistic from each of these groups of statistics is used for assessing the degree of inequality in the 50 state school finance systems. The first is the coefficient of variation. It is usually given in percentage form. For example, assuming a normal distribution, a coefficient of variation of 10 means that two-thirds of the students would have expenditures within 10 percent of the statewide average expenditure level, and that more than nine-tenths would have expenditures within 20 (2 times 10) percent of the average. The higher the coefficient of variation, the greater the inequity. The coefficient of variation includes observations on all pupils in the state. It is also sensitive to transfers from the top to the bottom, in that it would show more equality (decrease in value) if such a redistribution occurred. Finally, the coefficient of variation is insensitive to inflation, i.e., equal percentage increases. This property is desirable because if the system remains constant but all costs rise by the inflation rate, the coefficient of variation will remain the same, indicating that the equity of the distribution in the system has not changed. If inflation affects school districts in the state differently, however, then the coefficient of variation is not "inflation-proof."

If the statewide average expenditure per pupil were $1,500, these percentage figures would translate into an expenditure band of $150 above and below the average for two-thirds of the students or $300 above and below the average for over nine-tenths of students, i.e., an expenditure range of $300 for two-thirds and $600 for over nine-tenths of all students. For states with an average expenditure per pupil nearer $2,000, a coefficient of variation of 10 percent would allow a total dollar variation of $400 for the middle two-thirds of students and $800 for the middle 95 percent of students. These dollar variations indicate that even with a fairly low coefficient of variation, substantial variations in dollar amounts are still allowed. As a comparison, the *Serrano* judge required a dollar variation of no more than $200 per pupil.

The second statistic used is the McLoone Index. This statistic focuses only on the bottom half of all students; it is a ratio expressed as a decimal less than one. One minus the McLoone Index shows the amount that would have to be added to the bottom half of the distribution, expressed as a percentage of the median, in order to bring every pupil in the bottom of the distribution to the median level. For example, assume that the McLoone Index is .9, the median per pupil revenue is $1,000, and that there are 200,000 pupils in the state. Then (1 − .9) × $1,000 × 200,000 or $20 million would be needed to bring the pupils below the median to the median level. The closer a McLoone Index is to 1.0, the greater the equality for the bottom half. This statistic was selected because a primary concern of many school finance programs is to "level up" at least the bottom half. This statistic is also unaffected by changes caused by uniform inflation.

The restricted range is the third statistic used in the analyses in Section III. This statistic represents the absolute dollar difference between the pupil at the 5th and 95th percentiles of revenues per pupil. For example, a restricted range of $800 indicates that the revenues per pupil are $800 higher at the 95th percentile compared to the 5th percentile. The restricted range is one of the three measures that is insensitive to equal additions and sensitive to equal percentage increases. That is, the restricted range will increase with a uniform inflation rate in the state. Another characteristic of the restricted range is that it totally ignores the five percent of the pupils at the bottom and top of the distribution.

The forth and final measure chosen is the federal range ratio. The federal range ratio is the restricted range divided by the value of per pupil revenue at the 5th percentile. Thus, if the restricted range is $800 and the spending at the 5th percentile is $400 per pupil, the federal range ratio is 2. Another way to interpret the federal range ratio is that the 95th percentile spends 1 plus the federal range ratio times the 5th percentile. In our example, when the federal range ratio is 2, the 95th percentile spends 2 plus 1 or 3 times the 5th percentile. Although the federal range ratio ignores the upper and lower five percent of the distribution, it is not sensitive to equal percentage increases, i.e., uniform inflation.

Measures of the Equal Opportunity Principle

The statistics that measure the equal opportunity principle are different from the dispersion measures discussed above because the equal opportunity principle concern centers on determining whether there is a relationship between the children's object (revenues, expenditures, services, etc.) and certain discriminatory characteristics such as wealth or sex. The equal opportunity principle is satisfied when there is no relationship between the object and these illegiti-

mate characteristics. The measures of this principle determine whether a relationship exists and the extent of the relationship. For the remainder of the examination of the equal opportunity measures, the specific illegitimate characteristic of wealth per pupil will be used since the analyses in Section III examine this particular characteristic. However, the discussion of the measures is applicable for other illegitimate characteristics as well. The per pupil revenue variable is, as always, state and local revenues excluding debt service and capital and the per pupil wealth variable is property value, equalized within the state, but not necessarily equalized to full value.

School finance researchers have developed and used many measures that assess the relationship between revenues and wealth. Some of these measures are based on decile or quartile comparisons, others on regression techniques. However, even when a statistical technique such as regression is employed, numerous potential measures can be developed. Since the regression-based measures are often used to assess the equal opportunity principle in school finance, and since there are several regression-based measures from which to choose, only the regression-based measures are treated in this report.

Several measures of the relationship between revenues and wealth, including the correlation, slope and elasticity, can be derived from a simple regression with per pupil revenues as the dependent variable and per pupil wealth as the independent variable. Furthermore, other slope and elasticity measures can be derived from more complex regressions such as quadratic or cubic specifications. The formulas for seven relationship measures, including those based on the simple regression, are presented in Appendix Figure B-4.

At a very general level, the differences among the measures can be explained. The correlation measures the degree to which per pupil revenues and per pupil wealth form a linear relationship. On the other hand, the slope and elasticity measure the magnitude of the average relationship between per pupil revenues and per pupil wealth. The difference between the slope and the elasticity is that the slope assesses the relationship in absolute terms (i.e., a one dollar change in per pupil wealth is associated with a given dollar change in per pupil revenues) while the elasticity assesses the relationship in percentage terms (i.e., a one percent change in per pupil wealth is associated with a given percent change in per pupil revenues).

Another way of viewing the differences among the correlation, slope and elasticity measures is to examine the value judgments inherent in the measures. Appendix Figure B-5 shows how seven measures

respond to six questions that represent different values. The questions parallel the ones posed for dispersion measures, but they have been reformulated for dependent (revenue) and independent (wealth) variables.

One question that is important when the relationship between revenues and wealth is being assessed is whether the measure is sensitive to equal percentage changes in the wealth variable. Since, in Section III, interstate comparisons are made and since states equalize their wealth measures to different percentages of full value, an answer of NO for Question 6 is desired. A NO answer for Question 6 indicates that the equal opportunity measure will not depend on the equalization percentage that is utilized in each state.

The answers to the value judgment questions in Figure B-5 indicate that the relationship measures fall into three groups: the correlation is one, the slopes are a second and the elasticities form a third. Further evidence for these groups can be seen in Appendix Figure B-6 where the Spearman rank correlations among the pairs of measures are presented when the measures are used to rank 32 states.

Since the measures fall into these three groups and since the correlation and the eleasticity are not affected by different statewide equalization ratios, the simple correlation and the simple elasticity are used in the analyses presented in Section III. Recall that the correlation measures the degree to which per pupil revenues and per pupil wealth form a linear relationship, with +1 representing a perfect positive linear relationship and −1 representing a perfect negative linear relationship. A correlation measure of zero signifies the absence of a linear relationship. The simple elasticity measures the magnitude, in percentage terms, of the relationship. The elasticity indicates the association between a one percent change in per pupil wealth and a percentage change in per pupil revenues. For example, an elasticity of .33 indicates that a 1 percent change in per pupil wealth is associated with a .33 percent change in per pupil revenues. Note that both the correlation and the elasticity are unaffected by uniform inflation and different equalization ratios.

For the equal opportunity principle, a correlation of zero and an elasticity of zero represent perfect equity defined as no relationship with wealth, a variable that is considered illegitimate or unconstitutional. Although these two measures are treated separately, it may be appropriate to use them together. For example, a high correlation and a low elasticity may not represent unequal opportunity since there is a linear relationship, but of low magnitude. In several instances in the next section, both measures are interpreted together.

Finally, a comment on the unit of analysis is appropriate. Again, district level per pupil revenues and per pupil wealth are used to compute the measures. However, in order to weight the measures by the numbers of pupils in each district, the regressions are all run on a pupil weighted basis. Elsewhere the measures computed on a district and pupil weighted basis have been compared and some differences in results between the two statistical procedures were found (Berne and Stiefel, 1978a).

Taxpayer Equity Measures

As mentioned in the previous section, there are many technical problems associated with measuring tax burdens on districts, individuals or household units. There are a series of theoretical and empirical questions associated with the shifting of tax burdens by the corporate and business sector, i.e., passing tax burdens forward in the form of higher prices or backward in the form of lower wages. And there is debate over the proper income figure to use. Nevertheless, making some estimates of the burden of taxes used to support public education, and the subsequent linking of children's equity with taxpayer equity is an important component of making a complete assessment of the equity of a school finance system.

A limited number of tax burden measures are presented in the next section based on analyses obtained from Donald Phares of the University of Missouri at St. Louis, who is updating his book, *State-Local Tax Equity*. Phares' new book, which will be published in early 1980, will present a comprehensive analysis of the equity of all 50 state and local tax systems; the analyses presented here are only a small part of Phares' larger work (forthcoming).

In Section III, tax burdens are presented for the 50 states. One set of tables presents, for each state, tax burdens by 14 income classes for all state and local taxes. Tax burdens within one state can be compared across income classes to assess vertical equity, i.e., whether taxpayers within a state with different incomes pay different percentages of their income for taxes. Furthermore, tax burdens at any one income level can be compared across states in order to measure one view of horizontal equity, i.e., whether across states taxpayers with the same income pay the same percentage of their income for state and local taxes. Since there is uncertainty over tax incidence — in economic terms, who actually pays the taxes — tax burdens are presented with one set of incidence assumptions that are based on the conventional view of tax burdens, and one set of incidence assumptions that are based on the new view. The former provides the most regressive tax burdens while the latter the most progressive.

Although economists cannot select the "correct" set of assumptions, most would agree that the correct set lies somewhere between these two.

In order to focus more closely on education, tax burdens are also presented for the property tax in Section III. Again, the property tax burdens are presented for each state by 14 income classes under two incidence assumptions.

No measures are presented in Section III to assess the equal yield for equal effort principle. This principle is important in school finance and future research hopefully will yield a meaningful measure of this *ex ante* fiscal or wealth neutrality principle that can be computed with readily available data.

III. The Status of Equalization Among the States

Overall Changes: 1968-69 to 1978-79

As the first section of this booklet indicates, there are many possible equity goals for state school finance plans. In fact, the school finance and education tax structures in each state have been designed to accomplish many goals simultaneously. Indeed, even the school finance reforms of the 1970s had multiple objectives: to reduce wide expenditure per pupil differences; to make education services more equitable for children from rich and poor backgrounds; to diminish the link between educational opportunity and local wealth and income; to provide needed services for the handicapped, minority, limited English speaking student or student from a poverty background; to eliminate fiscal differences based on racial and ethnic lines; to improve the overall tax structure; to provide property tax relief; to enhance property tax reform; to reduce the regressivity of the property tax and other state and local taxes, etc. And much activity occurred on all these fronts during the past decade. Any statistical attempt at quantifying the degree of equity or change in equity in state school finance structures must recognize these multiple activities; conclusions on impacts of changes in state school finance and tax structures should not be drawn until progress on all goals and all policy objectives has been determined.

School finance programs have no unitary goal; sweeping generalizations about the impacts of new school finance plans that are based just on a statistical analysis of narrow equity objectives should not be made. Nevetheless, continued research to identify progress on all of the various equity goals of school finance plans must continue with vigor.

In addition, any current assessment of the status of equity on any particular school finance goal should be made within the historical context of vast overall changes in education finance over the past decade. Total expenditures for elementary and secondary education nearly tripled between 1968-69 and 1978-79; even after adjusting for inflation; real outlays for public schools have doubled in the past 10 years (National Center for Education Statistics, 1979). Such increases in expenditures have allowed for significant expansion of the education program for all children, both the average child and those children needing special services. State revenues appropriated

for public elementary and secondary schools during this time period have increased at a faster rate and greater absolute dollar level than any other source of revenues. State revenues for public schools tripled over this decade and now constitute the largest revenue source for public elementary and secondary education. Just between the 1977-78 and 1978-79 school years, state revenues increased by more than $5 billion dollars, a substantial amount even given the nation's high rate of inflation and despite the tax and expenditure limitation referenda. Expenditures per pupil also increased dramatically, reaching $1,798 in 1978-79 compared to $657 in 1968-69, another indication that education services for all students grew significantly during the past decade (NCES, 1979).

This increase in the base level of expenditures is a critically important variable in assessing the change in state school financing systems over this decade. Expenditure per pupil disparities are simply more acute when the base level is $657, than when it is three times that level.

In addition to these gross changes, there has also been startling progress in the development and expansion of programs for special pupil populations. All states now have enhanced programs for handicapped students, augmented by the recent federal Education for All Handicapped Children Act. Twenty states have compensatory education programs that complement Title I of the federal Elementary and Secondary Education Act. Seventeen states have programs of bilingual education for students for whom English is not the main language; these programs exist in nearly all states with the highest concentration of bilingual students. Furthermore, a number of states have special provisions that target additional aid into sparsely-populated rural school districts as well as urban factors that channel extra funds into fiscally pressed, central city school districts.

Movement on the tax front has also accompanied these vast changes in state education financing structure. Absolute property tax reduction was implemented with school finance reforms in a number of states; property tax rates became stabilized in many other states (Callahan and Wilken, 1976). State tax reform that has resulted in more progressive state and local tax structures was a complement to school financing changes in some states. And nearly every state has some form of circuit breaker program for the local property tax such that property tax overburdens are controlled for senior citizens and/or low income household units (Advisory Commission on Intergovernmental Relations, 1979). A growing number of states are extending circuit breaker protection to all low income households, thus insuring that the property tax will not impose an onerous bur-

den on those with limited resources, irrespective of age. Activity has also occurred on the assessment side of property taxation; successful suits have challenged illegal differential assessment practices and many states have bolstered state tax commissions in order to make the local tax base underpinning school finance more rational and uniform.

In short, action has occurred on many fronts in all states on issues that affect equity goals in school financing. While the limited results that are presented in the following portions of this section represent an important advance in quantifying statistically the status of equalization on a few school finance equity goals, they should be viewed as the initial findings of what should be a continuing effort to develop more extensive and comprehensive measures to determine the progress toward equity in school financing on the full range of possible goals.

Previous Assessments of Equity in School Finance

To assess the status of equalization in a state requires selecting a group — children or taxpayers; an object of interest — expenditures per pupil or tax burden, for example; an equity principle — equal treatment of equals, unequal treatment of unequals or equal opportunity; and appropriate statistics — such as a coefficient of variation or McLoone Index. To assess the attainment of all equity goals under all equity principles with numerous possible statistics would be a monumental task. Even to do so for one or two goals is a complex undertaking. To do so for one or two goals for all states is exceedingly difficult because comparable data for all school districts across states are hard, if not impossible, to obtain.

The following studies are examples of recent work that has attempted to assess the equity of state school finance systems. Since data and methodological constraints for these studies make statements on changes in individual states over time the most valid, that has been the emphasis of these studies. In addition, particular attention was given to the reform states to determine whether school finance reform speeded progress towards equity.

A pioneering effort by Brown et al. (1978) to assess the status of equalization used a sample of data from every state and looked at changes from 1970 to 1975.* That study looked at two children's equity issues within each of the 50 states. Under the equal treat-

*The study used the 1970 and 1975 Elementary and Secondary General Information Survey as the sample for data analysis. The major criticism on the sample is that it excludes most school districts with fewer than 300 students, a problem which may bias the results in many states.

ment of equals principle, it assessed the degree of expenditure per pupil inequality using two statistics: the coefficient of variation and the federal range ratio. Under the equal opportunity principle, it assessed the relationship between expenditures per pupil and property wealth per pupil. That study found that, nationally, expenditure per pupil disparities were severe in 1970, had not been decreased by 1975, and in some states had increased. The study also found that there was significant wealth related expenditure per pupil disparities in 1970 but that important progress was made by 1975 to reduce this relationship. In focusing on 19 of the early 1970s school finance reform states, the study found that progress had been made in reducing both expenditure disparities and the relationship between wealth and expenditures, but that substantially more progress was made on the latter than the former. The study noted, however, that in many nonreform states, both expenditure per pupil differences and the relationship between wealth and expenditures had become more inequitable over this five-year time span.

More recently, the National Center for Education Statistics in the 1979 edition of *The Condition of Education* (p. 140) has concluded that while substantial expenditure disparities exist in most states, in comparing 1977 with 1970 results, progress has been made in reducing expenditure per pupil differences within states. Using the federal range ratio as the statistical test and comparing changes between 1970 and 1977, NCES concludes that 28 of all 50 states reduced expenditure per pupil disparities over this time period and that 18 of the 25 reform states reduced disparities. These conclusions are much more optimistic then the report mentioned above.

In addition, Berne and Stiefel (1979) have reanalyzed the Brown et al. data using multivariate statistical analyses. Their conclusions are more optimistic. They found that when reform states are compared statistically to nonreform states, reform has led to reduction in expenditure per pupil disparities according to three of four statistical measures. Reform did not, however, have an effect on two measures of equal opportunity that relate expenditures to wealth. This last conclusion is difficult to generalize because the two statistical measures available from the Brown et al. data were not those commonly used in school finance studies.

Carroll (1979) has conducted one of the most rigorous analyses of school finance equity and the impacts of school finance reform for five states: California, Florida, Kansas, Michigan and New Mexico. Overall his results show that the reforms made more improvement in reducing the relationship between revenues per pupil and wealth per pupil than in closing revenue per pupil differences. Hickrod et

al. (1979) have analyzed the impact of the 1973 school finance reform in Illinois annually since 1974. He found consistent improvements as the plan was implemented during the first few years but changes in that pattern of improvement during the most recent years.

School Finance Equity Among the States, 1975-76

In this part, the values of equity measures from the study for this booklet are given for nearly all states, but on the basis of data from all school districts in each state (except for Nebraska, for which data for the smallest districts were not available).* This information, presented in Tables 1, 2 and 3, reflects statistical analysis of data provided by the various members of the School Finance Cooperative with some additional information gathered by ECS from official state statistical reports. Tables 1 and 2 present four measures of revenue per pupil inequality, under the equal treatment of equals principle for children. Table 3 presents two measures for the relationship between revenues per pupil and property wealth, under the equal opportunity principle for children. In all tables, the revenue measure is total revenue for current operating purposes from local and state sources. The pupil count is usually the average daily membership (ADM) count officially used by the state; in some instances, an attendance measure is used. Appendix A contains a more detailed description of the data used for each state.

Before discussing the results and implications of the results in these tables, a number of cautionary comments need to be made. While there has been a major effort to make the data as comparable as possible across states, there nevertheless are differences. This means that while comparisons of individual states over time can be made with some confidence, considerable care should be given to comparisons across states. In particular, in comparing one state to another, small differences in the value of any statistic should not be given much importance, i.e., if the coefficient of variation in one state is 15.5 and 16.0 in another, it would be better to conclude that the spending disparities are about the same rather than that one state is more equitable than another.

*The use of data from all school districts in a state allows for the most accurate assessments of equity. The problem is that gathering such amounts of data is a monumental and expensive task. The information in Tables 1, 2 and 3 is the result of a joint effort of the School Finance Cooperative. The figures for 1973 to 1976 are taken from official state sources and calculated by the Cooperative or ECS as indicated. As noted previously, all data are gathered with the school district as the unit of observation, but all statistics are calculated by weighting each district value by the number of students in the district. The results, therefore, are helpful for assessing state policy with respect to school districts and indicate the average impact of the school finance system on students.

On the other hand, the data problems are not so severe that no conclusions are warranted. For example, as will be shown, Minnesota appears to be equitable on most measures and New York inequitable on most. It is highly unlikely that these results would change if the data were perfectly comparable; both the relative grouping of the states and large differences in the statistics across states would probably remain even if all data problems were eliminated. In other words, while the statistical results in these tables should not be used to produce a precise 1-50 ranking of all the states, they can be used with confidence to show relative standing among the states or to divide the states into rough categories of, for example, most equitable, least equitable and somewhere in the middle.

At the same time, one needs to be aware that states have different policy objectives for their school finance and tax structures. The statistics in these tables, however, assess the equity of the systems irrespective of whether a particular state's objectives are necessarily consistent with all of those measures. In developing a system for assessing the equity of school finance systems for all states and for many objectives, this procedure is necessary. This means that a careful interpretation of the statistical results is required if they are used to make conclusions about individual states.

In Table 1, two statistical measures are given for revenue per pupil disparities among the states for selected years between 1973 and 1977: the coefficient of variation, which is a test for the inequality among all students, and the McLoone Index, which is a test of inequality for just the bottom half of the student population. The results are most complete for the school year ending in 1976.

In Table 2, two additional statistics are given for revenue per pupil disparities: the restricted range which indicates the dollar difference between the revenues per pupil behind the child at the 95th percentile and that of the child at the 5th percentile, and the federal range ratio which is the ratio of the restricted range divided by the revenues per pupil at the 5th percentile. As noted in the previous section, the smaller these figures, the greater the equality of the distribution of revenues per pupil, except for the McLoone Index.

In Table 3, two statistics are given that relate revenues per pupil to wealth per pupil: the correlation coefficient which indicates the existence of a linear relationship, and the elasticity which indicates the magnitude of the relationship. Again, the smaller these numbers the greater the equity. However, a medium to large correlation coefficient with a very small elasticity would mean that while spending differences were related to wealth, the magnitude of the relationship would be so small as to be possibly insignificant.

Table 1

Revenue per Pupil Disparities Within the States, 1973-77: A Comparison of Coefficients of Variation and the McLoone Index

	Coefficient of Variation					McLoone Index				
	School Year Ending					School Year Ending				
	1973	1974	1975	1976	1977	1973	1974	1975	1976	1977
Alabama[1]	14.7			12.1		.934			.932	
Alaska										
*Arizona[2]					20.0					.900
Arkansas[2]				18.8					.888	
*California[1]										
Elementary	21.6	19.8	18.6	17.9	16.8	.910	.928	.932		
High School	17.8	18.5	16.1	17.2	15.4	.877	.862	.868		
Unified	18.7	16.5	15.0	15.1	13.4	.888	.944	.923		
*Colorado[2]	18.7		19.1	—	19.6	.831		.858		.893
*Connecticut[1]				17.8					.890	
Delaware[2]				14.0					.879	
*Florida[1]	8.8	10.7	8.6	9.8		.944	.920	.921	.947	
Georgia[1]	29.8			33.6		.849			.835	
Hawaii	—			—		—			—	
Idaho[2]				15.4					.923	
*Illinois[1]										
Elementary	20.0			20.5		.929			.858	
High School	20.4			18.4		.881			.903	
Unified	9.6			21.5		.948			.913	
*Indiana[2]				16.2					.882	
*Iowa[2]										
*Kansas[1]	26.1		31.7			.827		.885		
Kentucky[2]	19.4			23.8		.921			.926	
Louisiana[1]	8.6			9.6		.928			.906	
*Maine[1]	22.7			18.3		.850			.880	
Maryland[1]				15.7					.921	
Massachusetts[1]				22.4					.910	
*Michigan[1]	15.4	13.7	13.2			.915	.905	.921		
*Minnesota[2]	15.3			12.5		.918			.930	
	(1972)					(1972)				
Mississippi[1]	15.8			15.4		.924			.926	
	(1972)					(1972)				
*Missouri[2]										
Unified			20.0	18.2				.926	.932	
*Montana										
Nebraska[2]										
(not Class I)				20.7					.886	
Nevada										
New Hampshire[1]				22.1					.895	
*New Jersey[1]			19.0	19.1	17.0			.874	.871	.891
*New Mexico[1]	15.3	18.0	16.8	13.7		.995	.976	.944	.961	
New York[1,2]				24.4					.816	
North Carolina[1]	12.0			10.8		.932			.949	
*North Dakota										
*Ohio										
Oklahoma[2]				21.3					.942	
Oregon[2]				19.4					.805	
Pennsylvania[2]				49.3					.724	
Rhode Island[2]				13.6					.911	
*South Carolina[1]	15.3			20.9		.905			.868	
*South Dakota[2]		19.7	20.0	17.9			.869	.875	.874	
*Tennessee[2]				24.2					.864	
*Texas[1]			24.5	22.5				.839	.884	
*Utah										
Vermont[1]				17.3					.880	
Virginia[2]				24.0					.892	
*Washington[2]	19.5		20.9			.864		.815		
	(1971)					(1971)				
West Virginia[1]				10.3					.951	
*Wisconsin[2]		14.6		14.2			.908		.901	
Wyoming[2]				25.4					.915	

*School finance reform states as of the end of 1977. Vertical lines indicate the year in which reform was passed. Iowa reformed in 1971. South Dakota's reform is effective in 1980 and South Carolina's in 1978.

[1]Data results from the School Finance Cooperative.

[2]Data results from ECS calculations from official state data.

Table 2

Revenue per Pupil Disparities Within the States, 1973-77: A Comparison of the Restricted Range and Federal Range Ratio

	Restricted Range					Federal Range Ratio				
	School Year Ending					School Year Ending				
	1973	1974	1975	1976	1977	1973	1974	1975	1976	1977
Alabama	$168			$229		.44			.38	
Alaska										
*Arizona					$496					.63
Arkansas				428					.70	
*California										
Elementary	555	$579	$576	663	669	.80	.68	.60	.61	.55
High School	844	793	768	816	750	1.03	.84	.80	.77	.60
Unified	613	534	480	483	571	.76	.56	.45	.40	.44
*Colorado	510		754		1,013	.71		.75		.81
*Connecticut				801					.80	
Delaware				592					.54	
*Florida	222	309	339	360		.26	.30	.29	.31	
Georgia	772			1,015		2.80			2.76	
Hawaii										
Idaho					353				.45	
*Illinois										
Elementary	574			802		.78			.91	
High School	893			1,138		.88			.87	
Unified	252			770		.29			.78	
*Indiana				624					.70	
*Iowa										
*Kansas	650		1,320			1.07		1.31		
Kentucky	407			651		.79			.88	
Louisiana	179			283		.29			.31	
*Maine	548			619		.97			.86	
Maryland				656					.60	
Massachusetts				1,421					1.10	
*Michigan	439	488	537			.56	.56	.56		
*Minnesota	401			562		.50			.50	
	(1972)					(1972)				
Mississippi	302			485		.78			.79	
	(1972)					(1972)				
*Missouri										
Unified			507	503				.66	.57	
*Montana										
Nebraska				716					.93	
(not Class I)										
Nevada										
New Hampshire				551					.61	
*New Jersey			819	840	1,007			.78	.85	.83
*New Mexico	286	366	356	353		.41	.50	.43	.37	
New York				1,591					1.04	
North Carolina	274			340		.51			.43	
*North Dakota										
*Ohio										
Oklahoma				333					.50	
Oregon				836					.80	
Pennsylvania				1,123					3.90	
Rhode Island				574					.58	
*South Carolina	296			604		.81			1.05	
*South Dakota		406	441	585			.67	.65	.88	
*Tennessee				504					.94	
*Texas			751	776				1.11	.89	
*Utah										
Vermont				833					.70	
Virginia				660					.77	
*Washington	482		792			.82		1.10		
	(1971)					(1971)				
West Virginia				313					.36	
*Wisconsin		602		590			.62		.48	
Wyoming				1,229					.97	

*School finance reform states as of the end of 1977. Vertical lines indicate the year in which the reform was passed. Iowa reformed in 1971. South Dakota's reform is effective in 1980 and South Carolina's in 1978.

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Table 3

Relationship Between Revenues per Pupil and Property Wealth per Pupil Within the States, 1973-77

	Correlation Between Wealth and Revenues					Elasticity Between Wealth and Revenues				
	School Year Ending					School Year Ending				
	1973	1974	1975	1976	1977	1973	1974	1975	1976	1977
Alabama	—			—		—			—	
Alaska										
*Arizona					.48					.09
Arkansas				.81					.33	
*California										
Elementary	.68	.66	.62	—	—	.17	.15	.11	.08	.08
High School	.83	.81	.74	—	—	.33	.33	.25	.24	.23
Unified	.81	.78	.76	—	—	.31	.26	.23	.22	.22
*Colorado	.80		.79		.67	.29		.29		.24
*Connecticut				.63					.20	
Delaware				.51					.24	
*Florida	.76	.62	.73	.77		.15	.15	.16	.19	
Georgia	.58			.93		.27			.65	
Hawaii										
Idaho				.64					.19	
*Illinois										
Elementary	.70			.52		.23			.17	
High School	.66			.48		.41			.26	
Unified	.59			.25		.18			.16	
*Indiana				.58					.23	
*Iowa										
*Kansas	.57		.85			.29		.52		
Kentucky	.71			.78		.38			.48	
Louisiana	.39			.37		.06			.06	
*Maine	.58			.32		.12			.04	
Maryland				.70					.36	
Massachusetts				.62					.05	
*Michigan	.63	.54	.61			.24	.21	.19		
*Minnesota	.41			.41		.15			.12	
	(1972)					(1972)				
Mississippi	.74			.79		.05			.06	
	(1972)					(1972)				
*Missouri										
Unified			.83	.81				.39	.36	
*Montana										
Nebraska (not Class I)				.67					.19	
Nevada										
New Hampshire				.53					.20	
*New Jersey			.39	.41	.46			.13	.14	.14
*New Mexico	.48	.36	.49	.37		.11	.09	.10	.06	
New York				.79					.40	
North Carolina	.76			.56		.29			.15	
*North Dakota										
*Ohio										
Oklahoma				.85					.27	
Oregon				.70					.33	
Pennsylvania				.81					.98	
Rhode Island				.45					.23	
*South Carolina	.76			.55		.38			.36	
*South Dakota		.82	.80	.76			.35	.32	.29	
*Tennessee				.46					.24	
*Texas			.60	.62				.14	.13	
*Utah										
Vermont				.49					.11	
Virginia				.71					.36	
*Washington	.55		.53			.16		.20		
	(1971)					(1971)				
West Virginia				.49					.17	
*Wisconsin		.55		.44			.17		.17	
Wyoming				.89					.28	

*School finance reform states as of the end of 1977. Vertical lines indicate the year in which the reform was passed. Iowa reformed in 1971. South Dakota's reform is effective in 1980 and south Carolina's in 1978.

In order to interpret the results in these tables, it might be useful to discuss the results for one state. Michigan, for example, had average state and local revenues per pupil in 1975 of about $1,200. The coefficient of variation for Michigan was 13.2 for the school year ending in 1975 which means that about two-thirds of all students were within 13.2 percent ($158) of the statewide average revenues per pupil and that more than nine-tenths of students were within 26.4 (2 times 13.2) percent ($316) of the statewide average. The McLoone Index was .921 which means that in the bottom half of the distribution, only 7.9 percent (1.0 − .921) of the revenues of the median pupil would be needed to bring the bottom half of all students up to the revenues per pupil of the median student. The restricted range was $537 which means that there was a $537 difference behind the revenues per pupil of the student at the 95th percentile compared to the student at the 5th percentile. The federal range ratio was .56 which means that the student at the 95th percentile has 1 + .56 or 1.56 as much revenues as the student at the 5th percentile. The relationship between revenues per pupil and wealth per pupil is 0.61 as indicated by the correlation, but only .19 as indicated by the elasticity, which means that a 50 percent difference in wealth is associated with just a 9.5 percent difference in revenues. In comparing the 1975 figures with the 1973 figure, the year of school finance reform in Michigan, all but the restricted range and federal range ratio have improved, which could mean that the reform in general produced more equity.* The federal range ration remained constant and the restricted range probably increased because the general level of revenues rose.

In order to discuss patterns that exist in the results of Tables 1, 2 and 3, judgments about equitable versus inequitable states must be made. A number of different procedures can be used to make these judgments. The first is based on relative comparisons, for which the states that rank consistently in the top or bottom quartile of all states are judged to be equitable or inequitable, respectively. Another procedure would require the setting of absolute cutoffs, where states that fall above one cutoff are equitable and states that fall below a second cutoff are inequitable.

The advantage of relative comparisons is that it is easier to choose a cutoff, such as the bottom and top quartiles or deciles. Unfortunately, the use of relative comparisons means that there will always be some inequitable states at the bottom, no matter how much all states improve. Absolute cutoffs, on the other hand, make it possible for every state to be equitable. But absolute cutoff points are difficult to determine. Furthermore, the appropriate absolute cutoff for

*For more on the fiscal impacts of the Michigan school finance reform, see Carroll, 1979.

states may vary according to characteristics such as number of districts, price differences, variations in district size, etc. Since the results in this booklet are a first attempt to make equity assessments on state school finance policies and since there are some differences in data definitions across states, only the relative comparison method is used in the following discussion. More research and better data are needed before absolute cutoffs could be determined with confidence. But ultimately, absolute cutoffs are needed.

The first set of conclusions, presented below, are based on the data in Tables 1, 2 and 3 for 35 states for 1976.* Conclusions are based only on states that rank in the top (bottom) quartiles of all four measures of revenue disparities and both measures of the relationship between revenues and wealth. When the relative comparison procedure is used:

1. Only one state, New Mexico, ranks in the top quartile of all six measures, although Minnesota also consistently ranks in the top quartile, except for one of the revenue disparity measures. Both states have foundation school finance programs, high percentage state roles and limitations on local spending above the foundation level. However, it would be premature to attribute the high equity rankings in Minnesota and New Mexico solely to these characteristics. Their consistently high rankings, however, do lend support to stating that their school finance structures are relatively fair.

2. Only three states, Florida, North Carolina and West Virginia, rank in the top quartile on all four expenditure disparity measures, but do not rank consistently well on the measures that show the relationship between revenues and wealth. A common characteristic of these states is their expenditure levels, which are below the national average.

3. Three states, Louisiana, Maine and New Jersey, rank equitable on both measures of the relationship between revenues and wealth, but do not rank well on the revenue disparity measures. Of these states, only one — New Jersey — has a guaranteed yield type of school finance formula, which might be predicted to produce this kind of result.

4. Three other states, Georgia, New York and Pennsylvania, rank in the bottom quartile on all revenue disparity measures and both measures of the relationship between revenues and

*See Appendix C for tables that rank the 35 states according to the four revenue disparity measures and the two measures of the relationship between revenues and wealth.

wealth. Again, while too much cannot be made of this finding, one characteristic in common among these states is a low foundation school finance program with low state roles.

The first generalization that should be made from these conclusions is that great care should be given to making conclusions about the equity of a state school finance system on the basis of either one statistic or one policy goal. For these 35 states, only 4 were identified as ranking consistently in the top or bottom quartile on all six measures for the two policy goals.

Second, there seem to be few characteristics in common among states that might explain why certain states rank consistently equitable or consistently inequitable. While some common characteristics are mentioned above, they should be interpreted as suggestive only and in no way as explanations either of why the states are grouped together or of why they are ranked high or low. It is simply difficult to find commonalities among Georgia, New York and Pennsylvania or among Louisiana, Maine or New Jersey.

Indeed, it would probably be more accurate to state that particular characteristics in each state's structure would be more relevant in accounting for their ranking equitable or inequitable than general characteristics across states. For example, a few very small districts with extremely large revenues per pupil could produce statistical results that indicate substantial statewide revenue per pupil differences, when the problem is localized for a few districts. This could be an issue in Texas. Likewise, regional divisions with, for example, one area of the state having uniformly high revenues per pupil with another having uniformly lower revenues per pupil could also produce statistical results indicating general statewide inequities. This could be an issue in New York or Illinois. In addition, some districts serve as fiscal agents for a regional district providing handicapped services for a number of school districts. If the categorical revenues for the fiscal agent district are not apportioned to the other member districts, an apparent inequity would be perceived when in fact one did not exist. These examples mean that all of these statewide results need to be interpreted and analyzed carefully within the finance structure of a particular state before policy conclusions are reached.

As further specific examples, revenue per pupil differences in Louisiana may be unrelated to property wealth because the property tax is used to only a small degree by local governments. Small revenue disparities in Florida may be due both to absolute and fairly low school tax rate caps and the small number and fairly large size of school districts. The large disparities in Pennsylvania and New

York could be caused both by a large number of districts, including many small ones, no limitations on local spending decision and relatively high average expenditure levels, all of which increase the possibility of having a wide spread in spending levels. While such unique characteristics may account for some of the results in these tables, the results nevertheless give some baseline information on the situation of the states in general on these two policy goals as measured by these six statistics.

Finally, for those states that score well on measures for one policy goal but not as well on another, it is wise to analyze the results in detail before making substantive conclusions about mixed results. For example, Florida scores consistently well on the revenue disparity measures, but not so well as the statistics that measure the relationship between revenues and wealth. The former can be interpreted correctly to mean that revenue disparities are small in Florida. But even though there is a high correlation between wealth and the revenue disparities that exist, the problem may not be a major one, both because the dollar amount of disparities that exists is small and because substantial wealth changes are needed to produce even marginal revenue differences. The coefficient of variation for revenue disparities is 9.8 percent, or rounded off, 10 percent. The average revenues per pupil in 1975-76 were about $1,375. This means that two-thirds of the students were within $137.50 of the average and 95 percent were within $275 of the average. While these dollar differences were strongly related to wealth (a 0.77 correlation), the elasticity of the relationship was .19, which means that for every 1 percent increase in wealth there was only a .19 percent increase in revenues. Or put differently, wealth had to increase by 5 percent for revenues to increase by 1 percent ($13.75 per pupil), or an increase of 50 percent in wealth was needed to increase revenues per pupil by just 10 percent ($137.50 per pupil). In short, even though there is a high correlation between revenues and wealth in Florida, the relatively low elasticity of this relationship together with the low coefficient of variation of revenues per pupil means one needs to investigate more carefully whether the correlation poses a significant policy problem or reflects an important inequity.

New Jersey, on the other hand, shows both a low correlation and elasticity relating revenues and wealth, i.e., the New Jersey system is relatively wealth neutral by this standard. However, substantial revenue per pupil differences exist, with 95 percent of students within only a $600 band above and below the average of $1,511 for 1975-76. If an important policy goal is to reduce revenue differences, the disparities that exist in New Jersey may be thought to be too large, even though they are not highly related to wealth differences. The data in Tables 1, 2 and 3 can also be examined to assess the

movement of the states over time. Indeed, the movement of a state school finance structure over a number of years is felt by many to be not only as important as its status in any one year but even more so. For example, the states of Georgia, New York and Pennsylvania, which scored low on all equity measures in 1976, could be moving in the direction of increased equity. If so, it would be unfair only to describe their inequitable status in any one year. Indeed, if those states were to enact a major school finance reform and phase it in over a number of years, it would take a while before they would improve their relative status in any one year to the top quartile; substantial progress towards equity over time would be a more informative way to characterize their status on school finance equity goals.*

The conclusions for changes over time in Tables 1, 2 and 3 are:

1. For 23 states, movements over time in revenue disparity can be observed. If the measures for the earliest and latest years available for each of these states are compared, only two of the states reduced revenue disparities, according to all revenue disparity measures. Nine, though, made improvements according to both the coefficient of variation and the McLoone Index. All nine were reform states. On the other hand, five of the states increased revenue disparities according to these two statistics and three of these were reform states. More states decreased disparities than increased disparities, but the evidence on the effect of reform cannot be determined from these data. (The vertical line in the tables indicates the year in which each state passed a reform. An analysis of the impacts of the reform should compare pre-reform years with post-reform years.)

2. For 21 states, movements over time in the relationship between revenues and wealth are available. Nine of these states, all but one of which underwent reform, reduced the relationship. Six of the states increased the relationship, and three of the six were reform states. More states reduced rather than increased the relationship between revenues and wealth, but once again the evidence on the effect of reform is unclear.

3. There is no evidence that states have moved in opposite directions on revenue disparities and the relationship between revenues and wealth. Of the 20 states for which data are available on all four measures in Tables 1 and 3, 7 states moved the same way on all four measures, and 16 states moved the same

*An excellent example of an analysis of the status of school finance equity over time is the series of reports on Illinois by Hickrod et al. (1979).

way on three of the four measures. Only three states moved one way on both revenue disparity measures and the opposite way on both relationship measures. These preliminary results indicate that the goals of revenue disparity reduction and reduction in the relationship between revenues and wealth may not be in conflict.

These conclusions once again highlight the need for a comprehensive assessment of equity. Very few states have consistent relative patterns over time on all measures for each equity objective. As with the information for one point in time, it is unwise to make generalizations on the basis of single measures or single policy goals.

For the above conclusions that are made, however, any magnitude of change in the statistics was used to document a change. This may be vesting too much significance in marginal changes in the values of the statistics. Although analyses can be conducted to test whether the changes are statistically significant, common sense indicates that a change in a coefficient of variation from 16.0 to 15.5 is not a large change. In addition to absolute changes, moreover, the consistency of the trend in changes over a number of years is important. While a change of 0.5 in a coefficient of variation in one year is not large, a consistent decrease of that magnitude over a number of years would reveal not only an important overall absolute change, but also a firm trend in the impacts of a particular state policy.

For example, the statistics for California and New Mexico in Table 1 indicate a trend for reducing revenue per pupil disparities over time. For California the trend is quite consistent and probably reflects the imposition of its revenue constraints which, over a five-year time period, allowed low spending districts to increase at a faster rate than high spending districts. Even though the figures jump around somewhat for New Mexico, the trend clearly is one of diminishing differences, a likely reflection of the inability of local districts to raise revenues beyond those allowed under the state foundation program.

The point here is that while comparisons can be made for states at two different points in time, it would be more desirable to make statements based on data over a number of years. Hopefully, the monitoring of equity in state school finance systems that is now mandated by the Congress will produce the longitudinal data base that is needed to make firm statements on the directions in which state systems appear to be moving over a multiple year time frame. As the profiling of state school finance systems becomes more developed and increasingly sophisticated, the need for current year as well as patterns of change over time will become more apparent.

School finance systems have been remarkably stable; substantial change in most cases will be evidenced primarily as accumulations of small changes over a multiple year time frame.

Tax Equity Among the States, 1975-76

In addition to the fairness of how funds are distributed among school districts and students, the fairness or equity of state and local taxes, specifically the local property tax and the total tax bill for all state and local public services are policy concerns. At issue is not just the tax burden, per se, but how this burden is apportioned among taxpaying units with varying abilities to pay, as measured by current income. Tables 4, 5, 6 and 7 display estimates of effective tax burdens (taxes as a percentage of income) for each of the 50 states by 14 income classes. These estimates are given for total state and local taxes and total local real property taxes, using both the conventional view (Tables 4 and 5) and the new view (Tables 6 and 7) of incidence assumptions.

In Tables 4, 5, 6 and 7 a current income figure that approximates a census definition of income is used. Under the conventional view, taxes on the business sector are assumed shifted to the consumer and allocated by consumption patterns; taxes on rented residential property are assumed shifted to the renter. Under the new view, taxes on the business sector are assumed to be borne by holders of capital as are taxes on rented residential property. All four tables make adjustments for tax exporting and importing among the states and for the federal offset, i.e., the deductibility of many state and local taxes in determining federal tax liability.*

In examining the total state and local tax burden under the conventional view (Table 4), two items stand out. First there are a few states that have tax burdens well above others. The highest tax burden state is Alaska, followed by Massachusetts, California and New York. After these come states such as New Hampshire, Vermont and Wyoming, where the relatively high tax burden has received less publicity. The lowest burdens are in Missouri, Florida and Alabama. These data show that the level and pattern of state and local tax burdens vary considerably across the 50 states.

Second, the regressive influence of the total state and local tax burden is clear. In most states, taxes as a percent of income is higher for the lower income than for the higher income taxpayer, but there are instances, such as Iowa or New York, where clear progressivity

*See Donald Phares, *Who Pays State and Local Taxes?* (forthcoming) for further details on these issues. The results in this booklet are preliminary results of Phares research.

exists at the top end of the income spectrum. Furthermore, if the middle of the income distribution where the majority of taxpayers is located is examined carefully, the conventional wisdom of regressive state and local taxation is softened somewhat. Proportionality or near proportionality over a rather large range of the income spectrum can be found for many states, including California, Illinois, Michigan, Minnesota, North Carolina, North Dakota and Wisconsin.

The reasons for these different patterns among the states is that the taxes used to finance state and local public services vary widely as does the relative role of the state and the local sector in financing these services. States with high local responsibility and heavy reliance on the local property tax usually have a more regressive tax burden than those in which the state assumes a greater fiscal responsibility and finances it with broadly-based state income and sales taxes as indicated by comparing the results in Tables 4 and 5. Table 5 isolates the impact of the local real property tax under the conventional view and shows the regressive impact this tax exerts as a component of the total system of state and local taxes, most particularly at the lower end of the income distribution. It should be noted, however, that as one moves up the income range, regressivity is generally still present but its influence becomes much less pronounced.

In comparing the results in Tables 6 and 7, which display the tax burdens under the new view of tax incidence, to the results in Tables 4 and 5, the general patterns are not changed substantially. The primary impact of the new view set of assumptions is to make the overall patterns of total tax burden less regressive, a result mainly of the burden pattern for real property tax (Table 7). For each state, the magnitude of the change in the patterns for total tax burden is largely a function of the relative role of the local property tax in raising total state and local tax revenues. The greater the role of the property tax, the less regressive the total tax burden under the new view (Phares, forthcoming). However, the total state and local tax burden is still regressive in many states. Under the new view of the property tax, the burden is still regressive in most income ranges, but substantial progressivity is evidenced in the upper income classes, especially the top three income classes where ownership of capital is most concentrated. As found in the earlier two tables, interstate variation is of considerable consequence.

These results show only a partial, though important, picture of the tax side of state school finance and tax systems. As mentioned in the first section, considerably more work is needed in developing the equity framework on the tax side. It would be desirable to combine

analytically the results for the distribution of education funds with these results for the equity of the state and local tax systems. Unfortunately, that was not possible for this booklet. In the longer run, however, the linkages between these two aspects of state school finance systems should be developed in order to allow conclusions to be reached that draw on the equity results of each.

Table 4

Total State and Local Tax Burden as a Percent of Income, 1975-76
Conventional View

State	Under $3,000	$3,000-$3,999	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$7,999
Alabama	30.3	15.8	13.5	12.2	11.2	10.4
Alaska	76.3	40.0	32.8	28.2	25.9	24.3
Arizona	48.9	25.3	21.4	20.1	17.1	14.8
Arkansas	31.1	15.7	13.2	12.2	10.6	9.9
California	47.8	23.8	20.0	18.0	15.7	14.3
Colorado	44.0	20.4	19.5	15.5	14.5	14.1
Connecticut	40.8	22.5	20.8	17.2	14.5	13.3
Delaware	24.9	13.5	11.4	10.6	9.2	9.5
Florida	34.6	17.5	15.3	13.7	12.3	11.3
Georgia	34.1	18.1	14.6	13.5	12.2	11.0
Hawaii	44.3	20.5	17.4	16.2	17.0	14.5
Idaho	36.0	17.7	15.4	13.4	12.8	12.5
Illinois	36.1	18.8	16.4	15.1	13.4	12.8
Indiana	30.7	17.4	14.8	13.5	12.7	12.0
Iowa	34.1	18.0	15.3	14.5	12.8	12.3
Kansas	31.1	16.9	14.6	13.2	12.4	11.6
Kentucky	29.8	15.8	14.1	13.1	11.3	10.7
Louisiana	33.5	18.1	15.8	13.9	12.6	11.9
Maine	33.3	17.8	15.5	14.0	12.3	11.5
Maryland	36.4	20.7	17.3	17.1	15.1	14.3
Massachusetts	51.6	22.9	21.5	19.6	18.2	15.9
Michigan	37.2	19.9	16.4	14.9	13.9	13.3
Minnesota	40.2	19.7	18.4	14.9	13.5	12.4
Mississippi	37.7	19.3	16.6	14.2	13.3	12.2
Missouri	33.2	17.6	14.7	13.4	12.0	11.2
Montana	42.3	22.2	18.0	15.8	14.9	13.6
Nebraska	37.2	19.2	16.3	15.2	13.2	12.9
Nevada	42.6	21.4	18.1	15.6	14.1	13.2
New Hampshire	50.7	22.4	20.4	17.6	13.7	13.4
New Jersey	48.5	24.2	20.0	18.5	16.0	14.4
New Mexico	41.2	21.7	17.5	15.4	14.2	13.3
New York	48.5	24.8	21.4	20.6	17.9	16.8
North Carolina	30.7	15.5	14.1	12.6	11.3	10.4
North Dakota	32.7	17.5	15.1	13.5	13.2	11.9
Ohio	32.6	17.3	15.0	14.0	12.3	11.3
Oklahoma	32.2	16.1	13.7	12.2	10.9	10.3
Oregon	39.7	19.0	16.1	14.3	13.6	12.1
Pennsylvania	32.9	17.8	14.9	14.1	14.2	12.5
Rhode Island	35.1	19.7	17.8	15.0	14.8	12.8
South Carolina	31.3	16.7	13.9	12.2	12.1	11.0
South Dakota	41.3	21.2	18.2	16.2	15.1	14.6
Tennessee	35.0	17.6	15.1	13.2	12.4	10.9
Texas	31.8	16.5	14.4	12.5	11.5	10.7
Utah	43.0	20.7	18.6	16.9	14.5	13.5
Vermont	46.5	25.0	19.8	18.7	16.0	14.9
Virginia	33.8	18.2	16.0	13.7	13.0	11.7
Washington	42.4	21.6	18.9	16.5	15.0	14.0
West Virginia	35.8	19.4	16.5	14.8	13.7	13.7
Wisconsin	38.1	20.4	18.1	14.7	14.3	13.4
Wyoming	53.3	27.6	22.0	20.7	17.3	16.7

Source: Donald Phares, *Who Pays State and Local Taxes?* Cambridge, Mass.: Oelgeschlager, Gunn and Hain Publishers, forthcoming.

$8,000-$9,999	$10,000-$11,999	$12,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$34,999	Over $35,000
9.8	9.3	8.6	8.0	7.7	7.3	7.3	7.7
22.0	20.2	18.8	17.7	17.0	16.4	16.2	16.6
14.7	12.9	11.8	11.3	10.1	9.8	9.9	11.0
9.2	8.9	8.2	7.8	7.9	7.8	8.0	8.5
13.4	12.1	11.4	10.8	10.9	11.1	10.9	13.4
11.8	11.2	11.4	10.0	9.5	9.0	8.5	10.5
12.3	11.0	10.3	9.6	8.5	8.1	7.6	9.7
8.8	8.4	8.3	7.6	7.2	7.2	7.4	10.3
10.3	9.8	8.8	8.0	7.5	7.4	7.8	7.9
10.3	9.8	9.4	9.2	8.8	8.3	8.4	9.1
13.4	12.7	12.2	11.4	10.5	10.6	10.1	11.6
11.2	10.8	10.1	9.4	9.6	9.2	9.4	10.8
11.9	10.9	10.0	9.3	8.6	8.3	8.3	9.7
11.1	10.4	9.7	9.1	8.7	8.1	8.2	8.9
11.6	10.8	10.2	9.9	9.2	9.7	10.2	11.7
11.2	10.5	9.7	9.1	8.7	9.3	8.7	9.7
10.0	9.7	9.0	8.9	8.5	8.6	8.2	10.3
11.0	10.2	9.6	9.0	9.0	8.7	8.8	10.2
11.4	9.7	9.2	9.1	8.9	9.2	8.9	11.4
13.1	12.4	11.6	10.9	10.3	9.9	9.1	9.7
15.3	13.9	12.7	11.8	11.1	11.2	10.4	12.5
12.0	11.2	10.5	9.8	9.2	9.1	8.7	10.1
12.1	11.7	11.4	11.1	11.2	11.3	11.7	12.6
11.0	10.1	9.5	9.1	9.1	8.8	8.8	10.7
10.6	9.8	9.0	8.7	8.2	7.8	7.7	8.8
12.4	11.6	10.7	10.3	9.9	9.9	10.7	12.2
11.1	10.6	9.8	9.0	9.2	8.7	9.6	11.2
11.8	11.3	9.7	9.1	8.6	8.0	7.6	9.3
11.7	10.5	9.1	8.0	7.1	6.4	6.3	9.2
13.9	12.2	10.4	9.2	8.4	7.8	7.7	9.0
12.0	11.1	10.4	9.5	9.1	8.7	8.5	9.5
15.5	14.3	13.4	12.5	12.7	13.1	13.8	15.7
10.2	9.6	8.8	8.6	8.5	8.0	7.5	9.3
10.9	10.3	10.1	9.8	9.7	9.4	9.8	9.8
10.3	9.5	8.9	8.3	8.0	8.0	7.9	9.0
9.1	8.4	8.2	7.9	7.9	7.8	7.1	9.0
11.6	10.0	9.6	9.6	9.3	9.4	9.4	12.5
12.3	11.1	10.1	9.6	8.7	8.4	8.4	10.3
11.8	11.1	10.3	9.8	9.3	9.1	8.9	10.6
10.3	9.7	9.1	8.8	8.5	8.1	7.6	8.8
12.5	11.4	10.8	10.1	9.3	9.5	10.5	11.0
10.4	9.4	8.4	7.8	7.2	6.9	6.9	10.4
9.8	9.0	8.4	7.8	7.1	7.2	6.9	8.3
12.5	11.8	10.9	10.2	9.5	9.3	9.3	10.3
14.6	13.7	12.8	11.8	11.7	10.3	11.6	13.1
11.3	10.8	9.5	9.1	8.5	8.2	7.7	8.1
12.3	11.1	10.4	9.5	8.7	8.3	8.4	11.7
11.8	10.9	10.5	10.0	9.5	9.3	9.4	11.2
13.2	11.7	11.1	11.1	10.7	10.6	10.6	12.2
15.1	13.3	12.3	11.2	10.5	9.9	10.4	12.6

Table 5

Local Property Tax Burden as a Percent of Income, 1975-76
Conventional View

State	Under $3,000	$3,000-$3,999	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$7,999
Alabama	2.1	1.1	0.9	0.8	0.8	0.7
Alaska	10.0	5.7	3.9	3.0	2.8	2.7
Arizona	16.1	7.9	6.6	7.0	5.0	3.9
Arkansas	5.2	2.5	2.1	2.0	1.7	1.4
California	24.8	11.5	9.3	8.1	6.9	6.2
Colorado	19.4	8.1	8.0	5.8	5.5	5.4
Connecticut	23.0	11.6	10.7	8.2	6.5	5.7
Delaware	7.1	3.7	3.0	3.0	2.3	2.6
Florida	10.0	4.5	4.1	3.7	3.2	2.8
Georgia	9.4	5.1	3.7	3.7	3.1	2.6
Hawaii	15.4	5.5	4.4	3.9	5.2	3.3
Idaho	13.5	6.1	5.3	4.2	3.9	3.8
Illinois	15.3	7.3	6.2	5.5	4.4	4.2
Indiana	12.9	6.5	4.9	4.3	3.9	3.5
Iowa	17.3	8.6	7.0	6.6	5.6	5.3
Kansas	11.6	5.5	4.5	3.9	3.4	3.4
Kentucky	5.8	2.7	2.6	2.0	1.8	1.5
Louisiana	3.7	2.0	1.8	1.6	1.3	1.2
Maine	13.9	6.6	5.5	4.5	3.9	3.5
Maryland	14.1	7.5	6.2	6.2	4.7	4.1
Massachusetts	37.4	15.1	13.2	11.4	10.2	8.2
Michigan	20.6	10.3	7.8	6.8	6.1	5.4
Minnesota	19.7	8.8	8.3	6.6	5.8	5.3
Mississippi	5.6	2.9	2.6	2.1	2.0	2.0
Missouri	11.3	5.7	4.4	4.0	3.3	3.0
Montana	14.4	7.2	5.7	4.8	4.5	3.9
Nebraska	15.0	7.5	6.3	6.0	4.8	4.8
Nevada	13.8	6.2	5.2	4.2	3.7	3.5
New Hampshire	34.1	13.9	12.3	10.7	7.9	8.0
New Jersey	33.5	15.6	12.2	11.4	9.5	8.3
New Mexico	7.3	3.8	2.6	2.1	2.0	2.0
New York	28.3	12.8	10.6	10.3	8.2	7.4
North Carolina	6.3	2.8	2.6	2.4	2.0	1.7
North Dakota	12.9	6.5	5.6	5.0	4.8	4.5
Ohio	15.1	7.2	6.1	5.7	4.9	4.1
Oklahoma	6.3	3.0	2.6	2.4	2.0	1.9
Oregon	22.1	10.1	8.1	6.7	6.4	5.5
Pennsylvania	14.1	6.6	5.3	4.9	4.3	3.4
Rhode Island	18.2	9.1	8.3	6.0	5.8	4.7
South Carolina	6.4	3.6	2.7	2.4	2.5	2.2
South Dakota	16.3	7.9	6.6	5.9	5.5	5.4
Tennessee	8.1	3.8	3.3	2.8	2.8	2.2
Texas	9.2	4.4	3.9	3.1	2.8	2.6
Utah	14.1	6.4	5.7	5.1	3.8	3.3
Vermont	26.1	13.7	9.5	8.8	6.9	6.2
Virginia	8.8	4.8	4.7	3.4	3.3	2.9
Washington	9.3	4.2	3.5	2.9	2.7	2.5
West Virginia	3.9	1.9	1.5	1.4	1.3	1.8
Wisconsin	18.4	9.1	7.8	5.8	5.6	4.8
Wyoming	16.7	8.6	6.3	6.5	4.7	4.8

Source: Donald Phares, *Who Pays State and Local Taxes?* Cambridge, Mass.: Oelgeschlager, Gunn and Hain Publishers, forthcoming.

$8,000-$9,999	$10,000-$11,999	$12,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$34,999	Over $35,000
0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.6
2.3	2.0	1.8	1.9	1.5	1.3	1.3	1.7
4.4	3.3	2.7	2.6	2.1	2.4	2.4	3.2
1.3	1.3	1.1	1.0	1.0	1.0	1.1	1.6
5.7	4.8	4.2	3.6	3.1	3.0	2.9	4.1
4.0	3.5	3.2	2.6	2.5	2.3	2.3	3.6
5.1	4.3	3.9	3.4	2.7	2.4	2.1	2.6
2.0	1.8	1.6	1.5	1.3	1.3	1.4	1.4
2.5	2.5	2.1	1.9	1.8	1.8	2.3	2.3
2.4	2.4	2.1	1.8	1.7	1.5	1.6	2.6
3.0	2.4	2.5	2.0	1.6	1.4	1.3	2.3
3.1	2.8	2.4	2.2	2.3	2.0	2.3	3.1
3.8	3.3	2.8	2.5	2.2	2.1	2.2	3.1
3.2	2.8	2.4	2.1	1.9	1.8	1.8	2.2
4.4	4.0	3.8	3.3	2.9	3.3	3.2	3.8
3.0	2.7	2.3	1.9	1.7	1.9	1.7	2.4
1.5	1.3	1.0	1.0	0.9	0.9	1.1	1.3
1.1	1.0	0.9	0.8	0.8	0.7	0.8	1.2
3.3	2.5	2.3	2.1	1.8	1.8	1.5	2.2
3.6	3.3	3.1	2.7	2.4	2.2	2.0	2.5
7.7	6.3	5.3	4.6	4.0	3.8	3.3	4.7
4.6	4.0	3.6	3.1	2.7	2.6	2.4	3.1
4.7	4.1	3.6	3.0	2.8	2.6	2.9	3.2
1.7	1.5	1.3	1.1	1.1	1.0	1.0	1.9
2.8	2.4	2.1	1.9	1.6	1.4	1.7	2.2
3.5	3.0	2.7	2.4	2.2	2.4	2.6	3.1
3.6	3.6	3.2	2.7	2.8	2.5	2.9	3.4
3.0	3.1	2.3	2.1	2.1	1.8	1.6	2.6
6.7	6.0	5.0	4.3	3.7	3.2	3.1	4.5
7.8	6.8	5.4	4.4	3.9	3.5	3.5	4.0
1.6	1.5	1.5	1.2	1.1	0.9	1.0	1.3
6.5	5.5	4.8	4.0	3.6	3.5	3.7	6.1
1.7	1.4	1.2	1.1	1.2	1.0	0.9	1.3
3.7	3.3	3.0	2.6	2.6	2.6	2.8	3.4
3.6	3.2	2.8	2.4	2.1	2.1	2.2	2.7
1.7	1.5	1.4	1.3	1.2	1.3	0.9	1.4
5.1	4.1	3.7	3.1	2.9	3.1	3.3	4.3
3.3	2.8	2.3	2.0	1.6	1.5	1.4	1.8
3.9	3.4	3.1	2.6	2.3	2.1	1.9	2.7
2.0	1.8	1.5	1.3	1.4	1.2	1.0	2.0
4.3	3.9	3.7	3.4	3.0	3.3	4.1	3.7
2.4	2.0	1.7	1.6	1.4	1.3	1.3	2.6
2.4	2.1	2.0	1.8	1.5	1.8	1.7	2.8
3.1	2.8	2.3	2.0	1.7	1.7	1.6	2.1
5.6	5.1	4.4	3.6	3.5	2.6	2.8	2.9
2.5	2.6	2.0	1.7	1.6	1.5	1.3	1.9
2.0	1.7	1.5	1.4	1.1	1.1	1.1	2.0
1.0	0.9	0.9	0.8	0.7	0.7	0.9	0.9
4.7	3.8	3.2	2.8	2.4	2.4	2.1	2.6
4.1	3.5	3.2	2.8	2.7	2.4	2.8	3.7

Table 6

Total State and Local Tax Burden as a Percent of Income, 1975-76 New View

State	Under $3,000	$3,000-$3,999	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$7,999
Alabama	30.0	15.6	13.3	12.1	11.1	10.4
Alaska	74.5	40.2	32.6	27.4	25.4	23.9
Arizona	46.2	24.5	20.7	20.0	16.6	14.1
Arkansas	30.8	15.5	13.1	12.2	10.4	9.8
California	45.0	22.2	18.7	17.[illegible]	14.7	13.4
Colorado	42.0	18.5	19.7	14.4	13.4	14.0
Connecticut	38.1	21.9	21.7	17.0	13.8	12.4
Delaware	24.1	13.2	11.0	10.4	8.8	9.5
Florida	33.7	16.8	15.0	13.4	11.9	10.9
Georgia	33.4	17.8	14.2	13.4	11.9	10.6
Hawaii	44.3	19.3	16.3	15.4	17.5	13.8
Idaho	35.3	17.3	15.0	12.9	12.4	12.3
Illinois	34.0	17.8	15.6	14.8	12.7	12.3
Indiana	29.7	16.9	14.3	13.0	12.3	11.7
Iowa	32.8	17.5	14.9	14.5	12.4	12.0
Kansas	30.3	16.5	14.2	12.9	12.3	11.4
Kentucky	29.3	15.5	13.9	13.1	11.1	10.5
Louisiana	32.9	17.8	15.6	13.7	12.4	11.8
Maine	31.8	17.2	14.9	14.0	11.7	11.0
Maryland	35.2	20.7	16.8	17.0	14.7	13.7
Massachusetts	50.6	20.2	20.6	19.0	17.9	14.7
Michigan	35.5	19.1	15.7	14.3	13.5	13.0
Minnesota	38.3	18.5	18.8	14.5	12.9	11.7
Mississippi	37.1	19.1	16.3	14.0	13.3	12.0
Missouri	31.7	17.0	14.1	13.1	11.6	10.8
Montana	41.0	21.9	17.3	15.4	14.5	13.3
Nebraska	36.4	18.6	15.7	14.9	12.9	12.6
Nevada	40.6	20.3	17.2	14.8	13.3	12.6
New Hampshire	49.1	21.0	21.0	18.2	12.7	13.0
New Jersey	45.2	23.1	19.2	18.4	15.4	13.7
New Mexico	40.3	21.4	17.1	15.0	13.9	13.1
New York	42.9	21.7	19.3	20.0	16.1	15.2
North Carolina	30.3	15.2	14.1	12.5	11.1	10.2
North Dakota	31.8	17.0	14.9	13.3	13.3	11.6
Ohio	31.3	16.7	14.4	13.9	12.0	11.0
Oklahoma	31.6	15.7	13.4	12.0	10.7	10.3
Oregon	38.5	17.9	15.1	13.2	12.8	11.4
Pennsylvania	31.9	17.2	14.3	14.1	14.2	12.0
Rhode Island	32.8	19.4	17.8	14.3	15.2	12.4
South Carolina	30.4	16.2	13.6	12.0	12.1	11.0
South Dakota	40.3	20.8	17.8	15.8	15.0	14.7
Tennessee	33.8	16.7	14.5	12.6	11.9	10.4
Texas	30.7	15.6	14.0	11.8	10.8	10.1
Utah	42.7	20.0	18.4	16.7	14.1	13.3
Vermont	44.5	23.8	19.2	18.1	15.4	14.5
Virginia	32.5	17.8	15.4	13.4	13.0	11.4
Washington	41.0	20.8	18.4	16.1	14.7	13.8
West Virginia	35.2	19.3	16.4	14.6	13.6	13.6
Wisconsin	36.3	19.5	17.9	14.0	13.7	13.0
Wyoming	52.4	27.1	21.3	20.1	16.7	16.3

Source: Donald Phares, *Who Pays State and Local Taxes?* Cambridge, Mass.: Oelgeschlager, Gunn and Hain Publishers, forthcoming.

$8,000-$9,999	$10,000-$11,999	$12,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$34,999	Over $35,000
9.7	9.3	8.5	7.9	7.7	7.3	7.3	8.3
21.5	19.7	18.4	17.5	16.9	16.2	16.1	17.0
14.4	12.5	11.4	11.0	9.9	9.8	10.3	12.5
9.1	8.9	8.1	7.7	7.9	7.8	8.1	9.3
12.9	11.5	10.9	10.4	10.6	11.1	11.0	15.3
11.1	10.6	10.2	9.5	9.3	8.7	8.9	12.8
11.6	10.4	9.8	9.4	8.0	7.8	7.2	11.2
8.5	8.2	8.1	7.5	7.1	7.1	7.3	11.1
10.0	9.6	8.5	7.9	7.4	7.4	8.1	9.0
10.0	9.6	9.2	9.0	8.7	8.2	8.7	10.4
13.1	12.1	12.0	11.3	10.3	10.3	10.0	12.6
10.9	10.6	9.8	9.3	9.7	9.2	9.7	11.8
11.4	10.6	9.5	9.0	8.2	8.1	8.2	11.3
10.9	10.2	9.4	8.9	8.6	8.2	8.2	10.0
11.4	10.7	10.0	9.7	9.1	9.7	10.6	12.5
10.9	10.5	9.5	9.0	8.6	9.3	8.7	10.4
9.9	9.5	8.9	8.8	8.4	8.6	8.2	11.2
10.8	10.1	9.4	8.9	8.9	8.7	8.8	10.8
11.4	9.4	8.9	9.1	8.7	9.5	9.0	12.9
12.6	12.1	11.2	10.7	10.1	9.7	9.0	10.6
14.8	13.0	12.0	11.2	10.5	10.9	10.0	15.9
11.5	10.8	10.1	9.4	9.0	9.1	8.5	11.9
11.8	11.3	11.0	10.8	11.1	11.2	11.7	14.4
10.9	10.0	9.4	9.1	9.1	8.7	8.8	11.5
10.3	9.6	8.9	8.5	8.1	7.7	7.8	10.2
12.2	11.6	10.4	10.1	9.7	9.9	10.8	13.3
11.0	10.3	9.6	8.7	9.1	8.7	9.8	12.3
11.3	11.1	9.4	8.8	8.4	7.8	8.5	10.9
11.2	10.1	8.6	7.4	6.9	6.0	6.2	12.4
14.5	11.7	9.9	8.6	7.9	7.4	7.5	10.9
11.8	11.0	10.4	9.5	9.1	8.8	8.7	10.0
14.2	12.9	12.1	11.5	11.8	12.5	13.9	21.0
10.1	9.4	8.7	8.5	8.5	7.9	7.5	10.1
10.7	10.1	10.0	9.7	9.6	9.4	9.9	10.4
10.0	9.2	8.6	8.1	7.8	7.9	8.1	10.3
8.9	8.3	8.1	7.8	7.9	7.8	7.1	9.6
11.0	9.6	9.1	9.3	9.2	9.4	10.1	14.7
12.1	10.7	9.8	9.3	8.5	8.3	8.4	11.7
11.4	10.9	10.0	9.5	9.1	8.9	9.0	12.3
10.1	9.7	9.0	8.6	8.4	8.0	7.6	9.9
12.4	11.3	10.7	9.9	9.3	9.5	10.7	12.1
10.1	9.1	8.0	7.7	7.0	6.8	7.0	12.7
9.2	8.6	8.1	7.5	6.8	7.2	7.1	10.2
12.3	11.6	10.7	10.0	9.5	9.3	9.4	11.2
14.3	13.4	12.6	11.5	11.6	10.1	12.4	15.6
10.9	10.7	9.2	8.9	8.3	8.1	7.7	9.0
12.1	10.8	10.2	9.3	8.5	8.2	8.6	12.7
11.7	10.8	10.5	9.9	9.5	9.3	9.6	11.8
13.4	11.3	10.7	10.9	10.7	10.7	10.9	13.7
15.1	12.9	12.0	11.0	10.3	9.8	10.4	14.1

Table 7

Local Property Tax Burden as a Percent of Income, 1975-76
New View

State	Under $3,000	$3,000-$3,999	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$7,999
Alabama	1.8	0.9	0.8	0.7	0.7	0.6
Alaska	8.2	5.9	3.7	2.2	2.3	2.3
Arizona	13.4	7.0	5.9	6.9	4.5	3.2
Arkansas	4.9	2.4	1.9	2.0	1.5	1.3
California	21.9	9.9	8.1	7.3	5.9	5.3
Colorado	17.5	6.2	8.2	4.7	4.4	5.3
Connecticut	20.3	11.0	11.6	8.0	5.8	4.8
Delaware	6.3	3.4	2.6	2.7	1.9	2.6
Florida	9.1	3.8	3.7	3.4	2.8	2.4
Georgia	8.7	4.8	3.3	3.6	2.9	2.2
Hawaii	15.4	4.2	3.3	3.2	5.7	2.7
Idaho	12.8	5.8	4.9	3.7	3.5	3.6
Illinois	13.3	6.2	5.3	5.2	3.8	3.7
Indiana	11.8	6.0	4.4	3.8	3.5	3.2
Iowa	16.0	8.1	6.6	6.6	5.2	5.0
Kansas	10.8	5.1	4.1	3.7	3.3	3.2
Kentucky	5.3	2.5	2.4	2.1	1.6	1.4
Louisiana	3.1	1.7	1.6	1.4	1.1	1.1
Maine	12.3	6.0	4.9	4.5	3.3	3.0
Maryland	12.9	7.6	5.7	6.2	4.2	3.5
Massachusetts	36.5	12.5	12.3	10.8	9.8	7.1
Michigan	18.9	9.5	7.2	6.2	5.7	5.2
Minnesota	17.8	7.6	8.7	6.2	5.2	4.6
Mississippi	5.0	2.6	2.4	1.9	1.9	1.8
Missouri	9.8	5.1	3.8	3.7	2.9	2.6
Montana	13.1	6.9	5.1	4.3	4.1	3.6
Nebraska	14.1	6.9	5.7	5.7	4.5	4.5
Nevada	11.8	5.1	4.3	3.3	2.9	2.9
New Hampshire	32.5	12.5	12.8	11.2	6.9	7.6
New Jersey	30.2	14.5	11.5	11.4	8.9	7.6
New Mexico	6.4	3.5	2.2	1.7	1.7	1.8
New York	22.7	9.6	8.6	9.7	6.5	5.8
North Carolina	5.8	2.4	2.6	2.4	1.8	1.5
North Dakota	12.1	6.0	5.3	4.7	4.9	4.1
Ohio	13.7	6.5	5.6	5.7	4.7	3.8
Oklahoma	5.8	2.6	2.3	2.1	1.8	1.9
Oregon	20.9	9.0	7.1	5.6	5.6	4.8
Pennsylvania	13.0	6.1	4.6	4.9	4.3	2.9
Rhode Island	15.9	8.8	8.3	5.3	6.2	4.4
South Carolina	5.5	3.2	2.4	2.1	2.5	2.2
South Dakota	15.3	7.4	6.2	5.5	5.3	5.5
Tennessee	6.9	2.9	2.7	2.3	2.4	1.7
Texas	8.1	3.5	3.5	2.4	2.2	2.1
Utah	13.8	5.3	5.5	4.8	3.4	3.1
Vermont	24.1	12.4	9.0	8.3	6.3	5.8
Virginia	7.6	4.5	4.2	3.1	3.4	2.6
Washington	7.9	3.4	3.1	2.6	2.4	2.2
West Virginia	3.4	1.8	1.4	1.2	1.2	1.7
Wisconsin	16.6	8.2	7.7	5.1	5.0	4.4
Wyoming	15.8	8.0	5.5	5.8	4.1	4.4

Source: Donald Phares, *Who Pays State and Local Taxes?* Cambridge, Mass.: Oelgeschlager, Gunn and Hain Publishers, forthcoming.

$8,000-$9,999	$10,000-$11,999	$12,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$34,999	Over $35,000
0.5	0.5	0.4	0.3	0.4	0.3	0.4	1.2
1.8	1.5	1.4	1.7	1.4	1.1	1.1	2.1
4.1	2.9	2.2	2.4	2.0	2.3	2.8	4.8
1.2	1.2	1.1	0.9	0.9	0.9	1.1	2.4
5.3	4.2	3.8	3.2	2.8	2.9	3.0	6.0
3.3	2.9	2.7	2.2	2.3	2.0		6.0
4.5	3.7	3.4	3.2	2.2	2.1	1.8	4.2
1.7	1.6	1.5	1.3	1.2	1.2	1.3	2.2
2.2	2.4	1.9	1.7	1.7	1.8	2.6	3.4
2.1	2.2	1.9	1.6	1.6	1.4	1.9	3.8
2.6	1.8	2.3	1.9	1.3	1.0	1.2	3.3
2.8	2.6	2.1	2.0	2.4	2.0	2.7	4.1
3.4	3.0	2.3	2.2	1.8	1.9	2.1	4.8
3.0	2.5	2.1	1.9	1.8	1.9	1.8	3.2
4.3	3.9	3.5	3.1	2.8	3.3	3.7	4.6
2.8	2.6	2.1	1.8	1.7	1.9	1.6	3.1
1.4	1.2	0.9	0.9	0.8	0.9	1.1	2.2
0.9	0.8	0.8	0.7	0.7	0.6	0.9	1.9
3.4	2.2	2.0	2.0	1.6	2.0	1.6	3.7
3.1	3.0	2.7	2.5	2.3	2.0	1.9	3.5
7.2	5.4	4.7	3.9	3.5	3.6	2.9	8.0
4.2	3.6	3.2	2.8	2.5	2.6	2.3	4.9
4.4	3.7	3.2	2.7	2.6	2.6	2.9	5.1
1.6	1.4	1.2	1.0	1.1	0.9	1.0	2.7
2.5	2.2	1.9	1.7	1.5	1.3	1.7	3.6
3.3	3.0	2.4	2.2	2.0	2.3	2.8	4.2
3.4	3.3	3.0	2.4	2.7	2.5	3.1	4.4
2.4	2.8	1.9	1.8	1.9	1.6	1.5	4.3
6.3	5.6	4.5	3.7	3.4	2.8	3.0	7.8
8.4	6.3	4.8	3.8	3.4	3.0	3.3	5.9
1.4	1.4	1.4	1.2	1.0	0.9	1.2	1.7
5.2	4.2	3.5	3.0	2.7	2.9	3.7	11.4
1.5	1.3	1.1	1.0	1.2	0.9	0.9	2.1
3.5	3.1	2.9	2.5	2.6	2.6	2.9	4.0
3.3	2.9	2.5	2.2	1.9	2.0	2.3	4.0
1.5	1.3	1.3	1.2	1.2	1.3	0.9	2.1
4.4	3.6	3.1	2.8	2.8	3.1	4.0	6.6
3.1	2.4	2.0	1.8	1.4	1.4	1.4	3.1
3.5	3.3	2.8	2.4	2.1	1.9	2.1	4.3
1.8	1.8	1.4	1.2	1.2	1.1	1.1	3.1
4.2	3.7	3.5	3.3	3.1	3.3	4.3	4.7
2.0	1.7	1.4	1.4	1.2	1.2	1.4	4.8
1.8	1.7	1.7	1.5	1.2	1.8	1.9	4.8
2.9	2.6	2.2	1.8	1.6	1.7	1.7	2.9
5.3	4.8	4.2	3.3	3.5	2.4	3.7	5.4
2.1	2.6	1.7	1.5	1.4	1.4	1.3	2.8
1.8	1.4	1.4	1.2	1.0	1.0	1.3	3.0
0.9	0.8	0.8	0.7	0.7	0.8	1.1	1.5
4.8	3.5	2.8	2.5	2.3	2.4	2.4	4.1
4.0	3.1	2.9	2.6	2.5	2.3	2.8	5.1

IV. Special Adjustments

In the section on equity, the unequal treatment of unequals principle for child equity states that there are differences among school districts and children that might require variations in the education services provided. An important question is how these extra need expenditure differences would affect the simple tests of expenditure disparities just presented. This section discusses this and other related issues. The first part presents some limited information on the sensitivity of the simple equity measures to various adjustments that can be made to account for spending variations that are related to differing pupil needs. This section also discusses the impact of a large and dominant school district. The second part of this section discusses the impact of adjustments to account for price differences, a special district adjustment.

Adjusting for Differing Pupil Needs

The principle of unequal treatment of unequals allows for spending differences as long as those differences are related to pupil needs. The results in the previous section made no adjustments for these kinds of variations. Current operating revenues per pupil for all purposes were subjected to the equity tests. But some expenditure differences should exist because districts spend differing amounts on special programs for numerous pupil needs. There are three straightforward adjustments that can be made to account for these differences. The first is to use a weighted pupil count to reflect differences officially recognized by the state. Revenues per weighted pupil would then be the object of the equity test. The second is to eliminate all categorical revenues from the total figure and analyze only revenues for the base education program available to all students. A third possibility is to examine relationship measures between revenues and pupil needs to determine if more money is available to districts with needier pupils.*

Table 8 shows the revenue disparity statistics and relationship statistics for selected states with and without the use of pupil

*A more complex method for recognizing the differing pupil need issue is explained by Walter Garms (1979). Garms uses multivariate regression analysis to account for different pupil needs; his method warrants further research to determine its full utility as a means to assess school finance equity.

weights; Table 9 shows the same statistics for a selected group of other states including and excluding the categorical aid revenues from the figure tested. The official weights in the various state programs are used to calculate the number of weighted students. Appendix D lists the weights used in the states shown in Table 8. The revenue figures in Table 8 include all categorical aids; only the pupil count has been changed.*

Table 8

Differences in Equity Between Unweighted and Weighted Pupil Counts

	Expenditure Disparities			
	Coefficient of Variation		McLoone Index	
	Unweighted Pupil	Weighted Pupil	Unweighted Pupil	Weighted Pupil
Florida (1974-75)	8.6	6.3	.921	.970
Illinois (1975-76)				
Elementary	20.5	21.5	.858	.867
High School	18.4	19.0	.903	.897
Unit	21.5	12.6	.913	.921
New Jersey (1975-76)	19.1	19.4	.871	.878
New York (1977-78)				
With NYC	22.4	20.7	.800	.800
Without NYC	26.5	24.8	.848	.845

	Relationship Between Spending and Wealth			
	Correlation		Elasticity	
	Unweighted Pupil	Weighted Pupil	Unweighted Pupil	Weighted Pupil
Florida (1974-75)	.73	.65	.16	.11
Illinois (1975-76)				
Elementary	.52	.55	.17	.19
High School	.48	.49	.26	.28
Unit	.25	.11	.16	.04
New Jersey (1975-76)	.41	.46	.14	.16
New York (1977-78)				
With NYC	.66	.67	.35	.30
Without NYC	.62	.65	.31	.27

*This analysis uses the official weights in each state to show the sensitivity of the simple equity tests to the use of a pupil count reflecting state recognized program cost differences. If a pupil weighting scheme were used to adjust the pupil counts in all states to reflect special need program cost differences, the use of a different weighting scheme for each state might not be the best adjustment. While the weights in some states may reflect actual program cost variations, often times the weights are selected partially on fiscal and political bases and may reflect values or policy trade-offs not relevant to the differing pupil need issue per se. For an analysis of one state over time, the use of state weights would be more appropriate. However, in making comparisons across states, a uniform set of weights, somehow determined, would be preferred in order to make the adjustments comparable across states. While the analysis presented here indicates briefly the impact of using a pupil weighted count, the best ways for making such an adjustment for all states would require substantial thought and much further research.

Table 9

Differences in Equity Measures Between Including and Excluding Categorical Aids

	Revenue Disparities			
	Coefficient of Variation		McLoone Index	
	With Categoricals	Without Categoricals	With Categoricals	Without Categoricals
California* (1976-77)				
Elementary	16.8	18.0	—	—
High School	15.4	16.0	—	—
Unified	13.4	13.0	—	—
Colorado (1977)	19.6	17.9	.893	.877
Michigan*(1974-75)	13.2	14.5	—	—
New Mexico(1974-75)	17.3	15.7	—	—
Wisconsin (1975-76)	14.2	13.9	.901	.902

	Relationship Between Spending and Wealth			
	Correlation		Elasticity	
	With Categoricals	Without Categoricals	With Categoricals	Without Categoricals
California				
Elementary	—	—	.09	.08
High School	—	—	.23	.25
Unified	—	—	.22	.24
Colorado (1977)	.67	.66	.24	.22
Michigan*(1975-76)	—	—	.22	.23
New Mexico(1974-75)	—	—	.10	.10
Wisconsin (1975-76)	.46	.46	.14	.14

*From Carroll, 1979.

The results in both Tables 8 and 9 do not generally show dramatic changes when weighted pupil counts are used or when categorical aids for the revenue figures are excluded. However, the changes are not insignificant enough to state confidently that the simple equity statistics are unaffected by the inclusion of student needs.

A large percentage change in the values of the statistics occurs in Florida, and the changes move each statistic in the direction of greater equity in all instances. This probably reflects the comprehensive set of pupil weights in the Florida school finance system and highlights the effect of using an official weighted pupil count for analysis of a particular state over time. In the case of the McLoone Index, Florida's position in the ranking of the states would change by over 10 states, although the changes on the basis of the other three statistics would be marginal. In short, the equity tests on a total expenditure figure may give an adequate picture of school finance equity in many instances, but more research on student needs is clearly in order.

An exception to the lack of dramatic changes in Tables 8 and 9 is for the unit districts in Illinois. The pupil weighting changes the statis-

tic considerably. But this result probably reflects a unique characteristic of the Illinois pupil weighting system and the swamping impact of a very large school district, Chicago. First, the only weighting in the Illinois system is for compensatory education. Students eligible for federal ESEA Title I aid are weighted an additional 0.0 to 0.75, depending on the concentration of such students — the greater the concentration, the higher the weight. Second, this weighting system increases the pupil count for Chicago dramatically. In addition, Chicago accounts for a large percentage of the weighted students in the unit districts. These factors together mean that Chicago dominates the unit districts. This dominance is probably more significant in accounting for the change in the values of the statistics than the weighting itself. A better test of the impact of the pupil weightings for Illinois would be to calculate the statistics for the unit districts with and without Chicago. As discussed more fully below for the case of New York, including or excluding New York City in the statistical tests makes about as large an impact on the values of the statistics as the use or nonuse of the pupil weights. The same may be true for the unit districts in Illinois, but the results also depend on the level of spending in the large city compared to the rest of the state.

New York City accounts for nearly one-third of all students in New York state. The data in Table 8 show that including New York City or excluding it changes the values of the equity statistics somewhat. This is to be expected, because the situation of New York City reflects the situation of one-third of the entire state when New York City is included in any statewide statistic. In other words, the place of one large, dominant district in an expenditure distribution can have an impact on the statistical results of a statewide statistic. There is no easy way to skirt this dominance and it is not clear that it is desirable to skirt it. There are two problems encountered when one large district is included. First, if the disparities within that district are very large, the statewide statistic will not reflect them. Second, policy changes may be easier to recommend and make if the effect of a large district on the statewide statistic is known. A possible solution is to present the statistics including and excluding the large district. Including the large district would give the statewide situation with the dominance of the big district; excluding it would give the equity status for the rest of the state.

Adjusting for Cost Differences

Another factor that would be a justification for expenditure differences across school districts would be price differences, i.e., differences that reflected the variation in the purchasing power of the education dollar. Current cost index research indicates that cost dif-

ferences can account for variations between plus or minus 10 percent about the average (Chambers et al., 1976; Chambers, 1978; Augenblick and Adams, 1979). While this is not a substantial variation, in some instances it can be quite important. However, when expenditure figures are adjusted for these price differences, the equity statistics may not change dramatically. For example, in Missouri the coefficient of variation for current operating expenditures per pupil in 1975-76 was 17.7 percent and the McLoone Index, .91; when the expenditure figures were adjusted by a cost of education index, the coefficient of variation changed to 16.7 and the McLoone Index to .92, marginal changes. Similarly, in Texas the coefficient of variation for state and local revenues per pupil in 1977-78 was 22.0 and the McLoone Index, .866. When these figures were adjusted by a cost index, the coefficient of variation changed to 22.7 and the McLoone Index to .850, again small changes. While more work needs to be done on the effect of cost differences, at this point there is some evidence that suggests such adjustments will not change the simple equity tests very much.

V. School Finance Equity Monitoring in the 1980s

The results in this booklet represent a first step towards monitoring the status and change in status of school finance equity across the country. This monitoring should continue through the 1980s. In late 1979 or early in 1980, this booklet will be augmented by the biennial profiles of school finance equalization to be published by NCES. Over time, the NCES profiles should provide important and needed information with which to evaluate: (1) the degree of equity attained by the school financing systems in all states; (2) the directions in which states are moving after a reform is enacted, as well as when reforms are not enacted; and (3) problems that could be addressed by a federal role in school finance equalization both among and within the 50 states.

It is hoped that the equity framework developed in Section I of this booklet is used by law makers and scholars alike in the next decade for both school finance policy and equity analysis discussions. The framework is sufficient to cover a wide variety of policy goals in school financing. If it is used consistently, it can provide a language, a set of terms and concepts that can be used with common meanings around the country. This would help to eliminate many of the current misunderstandings and inconsistencies in school finance policy discussions and, over time, would lead to a better understanding of the breadth of issues and concerns that are included under the school finance policy umbrella.

As the results in Section IV reveal, there is much progress left to be made before acceptable levels of equity in school financing structures are a fact in most states. Considerable progress has been made in many of the reform states, but even for most states that have begun to implement new finance systems, progress is incremental and many years are required before programs are phased-in fully.

The 1980s, however, will not be an easier decade for school finance reform than the 1970s. Indeed, there are many indications that the 1980s may be quite difficult for education in general as well as for education finance reform in particular.

First, enrollment declines are predicted to occur at least into the mid-1980s. Although inflation (which is higher today than it has ever been in the United States), legal and constitutional mandates

for additional education services for numerous special pupil populations, and even court mandates for school finance reform mean that it is difficult if not impossible to reduce education spending, the general public does not necessarily understand these realities and seems disappointed that education costs do not drop when enrollments fall. Declining enrollments also mean that there are fewer adults with school age children; this translates into a reduced constituency for schools. This decline in the direct political support for education in a time of high inflation and rising demands for other government services, especially services for the elderly, will make it increasingly difficult to maintain the current status of education, let alone to improve education, including enhancing equity in the financing of public school services.

As the 1980s approach, moreover, we see increased pressures for efficiency and accountability for education more than calls for greater equity. The rapid development of the minimal competency testing movement is a clear indication of this concern. In April of 1976, only eight states had legislation or state board resolutions requiring some form of minimal competency testing for high school graduation or grade-to-grade promotion. By January of 1979, the number had grown to 36; most of the remaining 14 are debating or considering such resolutions. While there is nothing wrong with these kinds of requirements per se, the simplistic ways in which many of them have been developed and implemented have impacted adversely on the populations that have been the special targets of many school finance reforms: the poor, the minority, the handicapped, the limited English speaking and migrant student. Minimal competency tests or other hastily implemented programs for efficiency and accountability not only could reverse the painstakingly won gains for these students in the 1970s, but also could impede their attaining additional progress in the 1980s.

Perhaps the event with the most potential to influence the outcomes of state school finance reforms is tax and expenditure limitations. Although the popular assumption is that "it all began with Proposition 13," the fact is that expenditure and tax controls are not a new phenomenon for school financing. School finance reform and the imposition of tax and expenditure limitations have gone hand in glove during the 1970s. Indeed, about 38 states now impose a variety of such controls on local school districts including tax caps, expenditure increase limitations, revenue and budget constraints and the need to obtain approval from either a vote of the people or a state budget review board to exceed the constraints (Education Commission of the States, 1978). Many of these measures were passed as essential elements of a school finance reform package, under the rationale both to control rising education costs and to phase-in re-

form programs gradually in order to make more efficient the spending of new dollars.

Expenditure and tax controls, however, could have tremendous implications for better or for worse for school finance. These measures can place severe restrictions on local and state budgets. As a result, they can make it very difficult for a state to inject substantial new funds into a revised school finance structure, a characteristic of nearly all the school finance reforms of the 1970s. As such, the restrictions can make it difficult to increase the overall state role in school financing. Tax and expenditure limitations at the state level, moreover, can restrict the increased use of the taxes considered by the public to be the fairest — state sales and income taxes — and maintain heavy reliance on the tax considered the least fair — the local property tax. State level restrictions could erode public satisfaction with the role of government and diminish the potential for making additional equity gains in school financing in the decade of the 1980s.

On the other hand, expenditure and tax controls have the potential for inadvertently hastening the equity impacts of already legislated school finance reforms. For example, as happened in California, education funding can be shifted from primarily local to primarily state funding due to local limits and state "bail-outs." In such a case, the state has the potential to implement more quickly reform intentions than would have been possible with more local control over levels of spending.

An additional phenomenon that may characterize the policy environment for the 1980s is reflected in the increase in activities to expand the "choice" aspects of the provisions for public education. The current interest in tuition tax credits is one aspect of this phenomenon. The voucher referendum on the Michigan ballot in November of 1978 and the voucher proposal that is likely to be on the ballot in California in 1980 are other examples. The stated concern by a number of public officials about the perceived impacts of school finance reform on "lighthouse" school districts and the related concerns with ways to keep the middle class in the public schools is another way this issue has been raised.

In short, the equity concerns in education financing that grew in the 1970s are likely to come into increasing conflict with concerns for choice and efficiency in the 1980s. Indeed, the debate over these conflicting values, while always extant, have again emerged and already affect the policy deliberations about the future of school finance reform.

Nevertheless, school financing is unlikely to become a dead issue. Debate about school finance structures and their inherent inequities occurs in all states during each legislative session, and in interim committees for nearly half the states. School finance is no longer a quiet issue discussed only by educators. School finance today is seen as one of the pivotal aspects of state/local public financing systems and the problems with unfair education finance systems are on the front burners of many state policy agendas.

Monitoring the status of school finance equity is an important component of maintaining the vigor of school finance reform activities. Using clear and consistent language to describe school finance reform objectives is another important element. Hopefully, the beginnings on these two fronts that are reflected in this booklet will contribute to the school finance reform efforts as the decade of the 1980s is entered.

Appendix A
Data Definitions

The data definitions used were agreed to at the initial meeting of the School Finance Cooperative in November 1977. As such, the definitions were chosen as the result of a group decision process where multiple objectives came into play including changes over time, interstate comparability, consistency with existing and available data, and manageability in terms of the number of alternatives considered.

The specific definitions of the variables utilized in this report for pupils, school resources, wealth, units of analysis and equality and wealth neutrality measures are discussed below. Time and space limitations preclude a detailed discussion of the advantages and disadvantages of each possible alternative for every measure. However, certain important alternatives to the selected definitions are outlined. In addition, for each variable the degree to which the reported data conform to the preferred definitions is summarized.

Pupils

Throughout this booklet, reference is made to pupils or variables that are computed on a per pupil basis. The preferred definition of pupil is average daily membership. The usual alternative is an attendance based measure, which is always lower than membership. In some states an enrollment figure was used. The actual definitions employed in each state are described below. For about two-thirds of the states a membership or enrollment based student figure is used, the other one-third use an attendance based figure. However, there is some variation in the way in which pupils are counted even when a membership definition is used. In nearly all cases, an identical pupil measure is utilized in each state over time.

School Resources

In order to keep the data base and this booklet to a reasonable size, one school resource measure from among a number of alternatives is utilized. The variable used is a revenue based measure that includes all revenues from state and local sources for current operating purposes; revenues for capital projects and debt service are excluded where possible. Revenues for compensatory education programs, handicapped programs, food service, adult education, community service, transportation and all categoricals are included where possible. Federal "impact" aid is excluded from local and state revenues unless state revenues are reduced by the amount of the impact aid. The revenue variable is for a school district and always reported on a per pupil basis.

There are two major classes of resource measures that could have been employed, given available data. One is an expenditure based measure that is usually defined in terms of "current operating expenditures" and the other is a revenue based measure that includes different sets of local, state and/or federal revenues. Although many arguments could be presented for and against the various alternatives, it appears that a number of measures are "valid" but they measure different subsets of resources. A complete enumeration of the characteristics of each alternative is not presented here, but one particular issue regarding the selected revenue measure, the inclusion of all state revenues including categoricals, is discussed briefly.

The basic issue is whether categorical state aid should be included in a revenue measure based on local and state revenues, particularly when the equality of revenues is in question.* An argument against their inclusion is that categoricals are often directed at specific needs and, therefore, in many cases the desired result of categorical aid may be to increase the inequality of revenues.

*A recent Office of Education report (E. O. Tron, *Public School Finance Programs, 1975-76*. Washington, D.C.: USOE, USGPO, 1976) indicates that in 1975-76, the $28.5 billion of state aid was comprised of approximately 83 percent general aid and 17 percent categorical aid.

On the other side, there are a number of reasons to include categoricals in a measure of local and state revenues. First, certain categoricals are not need related in such a way that they are intended to increase the inequality of revenues. Categorical aid for municipal overburden and pensions are two examples. In other cases it is difficult to determine the purpose or intent of the categoricals.

Second, it is difficult to have confidence that categoricals are different from other revenues when spending decisions are made at the local level. The exclusion of categoricals from a revenue measure implies that these revenues are spent on a specific group of pupils at the local level when this may not be the case.

A possible alternative methodology that could take special needs into account is to use a measure of "weighted" pupils to reflect different program costs instead of an unweighted pupil measure. If categoricals are targeted to certain groups of pupils and those pupils are weighted more heavily, then it could be argued that the weighted pupil measure should show equality of revenues because the revenue and pupil measures are commensurate. Although the data for most states in this report do not include weighted pupils, the states of Illinois, Florida, New Jersey and New York do have such data. The impact of the use of weighted compared to unweighted pupils is analyzed for these four states in Section IV. That section also analyzes for other states, the degree to which the analyses are changed if categorical revenues are excluded from the revenue figure.

There are also differences among the states in the way in which items such as social security and pensions are treated. In most states, employer social security and pension contributions are paid by the local school district and are, therefore, included in the revenue measures. However, there are some cases where employer social security and/or pension contributions are paid directly by the state to the federal government or state pension fund so that these payments do not appear as a revenue of the school district. If employer social security payments or pension contributions in a particular state can be thought of as an equal percentage of local and state revenues, then equality and wealth neutrality measures that are insensitive to equal percentage changes should be preferred for interstate comparisons. However, in some cases, for example when the proportion of salaries that exceeds the social security maximum varies across districts, an equal percentage assumption may only be an approximation.

It should be noted that in all cases (with one minor exception — Louisiana) the revenue measures used in a particular state are consistent over time.

Finally, federal impact aid is only explicitly mentioned in one revenue definition (New Mexico) where it is included. It is assumed that in all other states federal impact aid is excluded.

Wealth

The preferred wealth variable utilized in this report is a measure of equalized full value of property. It is recognized that other wealth conceptions exist such as fiscal capacity, income or income adjusted wealth, but the more traditional measure is used in this analysis for the reasons cited at the beginning of this section. The wealth variable is computed for a school district and always reported on a per pupil basis.

A wealth variable of some form is available for nearly all states. However, the reported property wealth is not always equalized on a statewide basis and when it is equalized statewide it is not always equalized to full market value. In a number of states the property values are not equalized on a statewide basis. That is, the data are reported in assessed value. In most states, however, some form of statewide equalization is in effect although not always to a full market level. For a number of states, the statewide equalization percentage is available and reported below, while in other states this percentage is not documented. The existence of differential statewide equalization percentages, both across states and over time, influences the selection of a wealth neutrality measure. Ideally, a wealth neutrality measure should not be sensitive to alternative statewide equalization percentages. Unfortunately, no wealth neutrality measure can correct for the intrastate variability caused by a failure to equalize assessments on a statewide basis.

Alabama

1. Pupils: Enrollment.
2. Revenues: Total district, county and state revenues plus other revenues. (The revenues include revenues for capital, since they could not be subtracted out.)
3. Wealth: Not available at district level.
4. Districts: All.

Arizona

1. Pupils: Average daily membership (ADM).
2. Revenues: Total State and local revenues for operating purposes, excluding capital.
3. Wealth: Taxable valuation.
4. Districts: All.

Arkansas

1. Pupils: Average number belonging.
2. Revenues: Local and state revenues excluding capital.
3. Wealth: Equalized valuation.
4. Districts: All.

California

1. Pupils: Average daily attendance (ADA).
2. Revenues: State and local revenues excluding revenues for debt service and capital.
3. Wealth: State equalized assessed value.
4. Districts: All unified districts separately.
   All high school districts separately.
   All elementary school districts separately.

Colorado

1. Pupils: ADA.
2. Revenues: Total local and state revenue excluding debt service and capital.
3. Wealth: State equalized assessed value. (Equalized to 20.58 percent of market for 1973, 20.7 percent for 1975, and unequalized in 1977.)
4. Districts: All districts except two in Rio Blanco County with extraordinarily high assessed value per pupil.

Connecticut

1. Pupils: Total adjusted resident ADM in the state.
2. Revenues: Net current local expenditures (as a measure of locally-raised revenues) plus total state aid for public schools excluding school building aid.
3. Wealth: Equalized net grant list (1976).

4. Districts: The 169 towns in the state with resident pupils. Regional school districts are excluded.

Delaware
1. Pupils: ADM.
2. Revenues: Total current operating expenditures.
3. Wealth: Equalized valuation.
4. Districts: All.

Florida
1. Pupils: ADA. Weighted pupils as in Appendix D.
2. Revenues: Local and state revenues.
3. Wealth: Equalized assessed value.
4. Districts: All.

Georgia
1. Pupils: ADM.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Idaho
1. Pupils: ADA.
2. Revenues: Total general fund revenues from state and local sources (excludes capital and building fund).
3. Wealth: Assessed valuation.
4. Districts: All.

Illinois
1. Pupils: ADA. Weighted students as in Appendix D.
2. Revenues: Local revenues for operations, general state aid and state categorical aid, excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All K-12 unit districts separately.
   All high school districts separately.
   All elementary school districts separately.

Indiana
1. Pupils: ADA.
2. Revenues: Total local and state revenues excluding revenues from bonds.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Kansas

1. Pupils: ADM.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Kentucky

1. Pupils: ADA.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: State equalized assessed valuation (equalized to 100 percent of market value).
4. Districts: All.

Louisiana

1. Pupils: ADM.
2. Revenues, 1973: Local and state revenues — local revenues include property taxes in the following categories: constitutional tax, special maintenance and operations tax, special leeway tax — at both the parish and district/ward level. Revenues also include: rents, leases, sales taxes, tuition, special appropriations, interest, grants, sale of junk and miscellaneous. State revenues are from the local equalization fund, sixteenth section lands (interest), Codofil (French language), revenue sharing, severance tax, contribution to teacher retirement, the state portion of vocational education, crippled and exceptional children's fund and adult education.

   Revenues, 1976: Same as 1973 but local revenues also include food service collections and state revenues include all vocational education revenues.
3. Wealth: Assessed value (note: equalized assessed value is not used in aid distribution until 1976-77).
4. Districts: All.

Maine

1. Pupils: ADM.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Maryland

1. Pupils: ADM.
2. Revenues: Local and state revenues excluding debt service and capital.

3. Wealth: Equalized assessed valuation.
4. Districts: All.

Massachusetts

1. Pupils: ADM.
2. Revenues: Expenditures from local and state revenues, with minor exceptions, excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Michigan

1. Pupils: State aid membership is defined as the number of pupils legally enrolled at the close of school on the fourth Friday following Labor Day.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: State equalized assessed value.
4. Districts: All K-12 districts.

Minnesota

1. Pupils: ADM.
2. Revenues: Total state and local revenues excluding debt service and capital.
3. Wealth: Total assessed valuation (equalized to 27.94 percent of market value for 1972 and 22.06 percent for 1976).
4. Districts: All districts except two with extraordinarily low property value per pupil.

Mississippi

1. Pupils: End of first month enrollment.
2. Revenues: Local and state revenues — local revenues include all revenues from local sources: property taxes, mineral lease tax, other taxes, tuition and transportation fees, sixteenth section income and revenues from intermediate sources. State revenues are for the minimum program, vocational education, community funds, the severance tax, homestead reimbursements, driver education, adult education and textbooks. However, since local revenues include property taxes for capital purposes, expenditures for capital and debt services are excluded from the revenue total.
3. Wealth: Assessed property valuation (note, not equalized).
4. Districts: All.

Missouri

1. Pupils: ADA.
2. Revenues: Total local and state revenue excluding debt service

and capital.
3. Wealth: Equalized assessed valuation, adjusted to 33.3 percent of market value.
4. Districts: All unified districts.

Nebraska
1. Pupils: ADM.
2. Revenues: Total general fund revenues from state and local sources.
3. Wealth: Assessed valuation.
4. Districts: All but districts with enrollment under 300.

New Hampshire
1. Pupils: Total number of ADM in residence.
2. Revenues: The sum of locally raised revenues, and all state aid paid excluding school building aid, area vocational school aid and "other revenue from state sources" (primarily construction aid for area vocational schools).
3. Wealth: Equalized property valuation for 1974.
4. Districts: Includes all single town districts and cooperative school districts in the state.

New Jersey
1. Pupils (unweighted): The number of children who reside in the school district and are enrolled on September 30 in public schools either in their own district or in a district to which the school boards pays tuition. This count does not include students sent to county vocational schools.

   Pupils (weighted): The sum of unweighted pupils plus 0.75 for each AFDC student for 1975, and the use of the weights in Appendix D for 1976 and 1977.
2. Revenues: Sum of locally raised revenues for operating expenditures and state aid for operating expenditures. Locally raised revenues for capital and debt expenditures are excluded.
3. Wealth: Annual equalized property valuation.
4. Districts: Includes all districts with resident pupils but excludes county vocational school districts, county special services districts, and three school districts with extraordinarily high property wealth and negligible student counts.

New Mexico
1. Pupils: ADM.
2. Revenues: Local and state revenues plus federal impact aid (P.L. 874 revenue).
3. Wealth: Equalized assessed value.
4. Districts: All.

New York

1. Pupils (unweighted): The sum of pupils in ADA for grades 1-12 plus one-half the pupils in kindergarten. This is a district count.

   Pupils (weighted): The total aidable pupil units (TAPU) in the state which is made up of 13 separate categories of students. Weightings are applied for special education needs (students scoring low on the state proficiency exam), full day kindergarten and grades 1-6, grades 7-12, one-half day kindergarten, summer school and evening school. Pupils in classes for the severely handicapped are excluded; students in occupational classes receive only their secondary weight.
2. Revenues: The sum of total local levies, total operating aid paid, transportation aid, reorganization incentive aid, severely handicapped aid (to the Big 5) and occupational education aid (to the Big 5).
3. Wealth: Full value of taxable real property for 1974 (as equalized by the state).
4. Districts: Only school districts having at least eight professional staff or more are included in the analyses. These are the major school districts typically employed in analyses prepared by the New York State Education Department. Corning has been omitted because the state data tapes contained erroneous information.

North Carolina

1. Pupils: ADM.
2. Revenues: Operating revenues from state and local sources.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Oklahoma

1. Pupils: ADA.
2. Revenues: Total local, county and state revenues.
3. Wealth: Total net valuation.
4. Districts: All.

Oregon

1. Pupils: Resident ADM.
2. Revenues: Local revenues, state equalization and flat grant aid, excluding debt service and capital.
3. Wealth: Assessed property valuation equalized to 100 percent of market value.
4. Districts: All.

Pennsylvania

1. Pupils: ADM.
2. Revenues: Total local and state general fund revenues.
3. Wealth: 1975 market value.
4. Districts: All.

Rhode Island

1. Pupils: Resident ADM
2. Revenues: Local and state revenues for operating purposes.
3. Wealth: Assessed valuation adjusted to 100 percent of market value and adjusted by a 1970 census median family income ratio.
4. All, component elementary districts aggregated into regional districts.

South Carolina

1. Pupils: 35-day enrollment
2. Revenues: Local and state revenues — local revenues include: current property taxes, delinquent taxes, other taxes, appropriations and other local receipts. State revenues include all revenues except: vocational education — construction and equipment and the state school building fund.
3. Wealth: Assessed property valuation (equalized values not available).
4. Districts: All.

South Dakota

1. Pupils: ADM.
2. Revenues: Total state and local revenues excluding debt service and capital.
3. Wealth: Total equalized assessed valuation, weighting agricultural property 50 percent and nonagricultural property 100 percent.
4. Districts: All.

Tennessee

1. Pupils: ADM.
2. Revenues: Total state and local revenues.
3. Wealth: Assessed valuation.
4. Districts: All.

Texas

1. Pupils: ADA.
2. Revenues: Local and state revenues.
3. Wealth: Governor's Office equalized value in 1975 divided by 1975 ADA.
4. Districts: All.

Vermont

1. Pupils: Enrollment.
2. Revenues: Local and state revenue excluding debt service and capital.
3. Wealth: State adjusted value of local property (adjusted to 100 percent of market value).
4. Districts: All districts except three with extraordinarily high assessed value per pupil.

Virginia

1. Pupils: ADM.
2. Revenues: Total revenues from state, city-county and district funds, excluding revenues from loans and bonds.
3. Wealth: Assessed valuation — 1974 true value.
4. Districts: All.

Washington

1. Pupils: ADM in residence averaged over the first 30 days of the school year.
2. Revenues: Local yield plus all state aid excluding building aid.
3. Wealth: 100 percent of fair market value for 1974 as calculated by the state.
4. Districts: Includes all 246 nonunion districts — those with resident pupils and which are eligible for state aid.

West Virginia

1. Pupils: ADA.
2. Revenues: Local and state revenues excluding debt service and capital.
3. Wealth: Equalized assessed valuation.
4. Districts: All.

Wisconsin

1. Pupils: Resident membership.
2. Revenues: Total state and local revenues including up to a maximum of $100/pupil for capital outlay.
3. Wealth: Full market value.
4. Districts: All.

Wyoming

1. Pupils: ADM.
2. Revenues: Total local and state revenues.
3. Wealth: Assessed valuation.
4. Districts: All.

Appendix B

This appendix includes more details on the revenue disparity measures and the relationship measures between revenues and wealth. Figure B-1 displays the formulas for 11 revenue disparity measures. Figure B-2 presents an analysis of the value judgments that are inherent in the revenue disparity measures. The value judgments are expressed as questions on Figure B-2.

Data are available from the School Finance Cooperative and Education Commission of the States to rank 35 states on nine of the revenue disparity measures using data from 1976. In order to indicate empirically how the measures compare to one another, Figure B-3 shows the Spearman rank correlations for all pairs of revenue disparity measures.

Similar information is contained in Figures B-4 through B-6 for the relationship measures between revenues and wealth. Figures B-4 and B-5 contain the formulas and value judgments, respectively. Figure B-6 displays the Spearman rank correlations between pairs of relationship measures used to rank 32 states for 1976. The results in both Figures B-3 and B-6 show that the measures rank the states differently and that different measures make different conclusions on the status of equity among the states.

Figure B-1

Formulas For Revenue Disparity Measures (Pupil Weighted)

The following symbols are used in the formulas: P_i = number of pupils in district i; N = number of districts; X_i = average revenues (expenditures) per pupil in district i; $\bar{X}_p$ = mean revenues per pupil for all pupils; M_p = median revenues per pupil for all pupils.

1. The range: Highest X_i – lowest X_i.
2. The restricted range: X_i at or above which 5 percent of the pupils lie — X_i at or below which 5 percent of the pupils lie.
3. The federal range ratio: (restricted range) / (X_i at or below which 5 percent of the pupils lie).
4. The relative mean deviation: $$\left(\sum_{i=1}^{N} P_i \left| \bar{X}_p - X_i \right|\right) \Big/ \left(\bar{X}_p \sum_{i=1}^{N} P_i\right)$$
5. The McLoone Index: $$\left(\sum_{i=1}^{J} P_i X_i\right) \Big/ \left(M_p \sum_{i=1}^{J} P_i\right)$$ where districts 1 through J are below M_p.
6. The variance: $$\left(\sum_{i=1}^{N} P_i (\bar{X}_p - X_i)^2\right) \Big/ \left(\sum_{i=1}^{N} P_i\right)$$
7. The coefficient of variation: $\sqrt{VAR} / \bar{X}_p$.
8. The standard deviation of logarithms: $$\left[\left(\sum_{i=1}^{N} P_i (Z - \log_e X_i)^2\right) \Big/ \left(\sum_{i=1}^{N} P_i\right)\right]^{1/2} \text{ where } Z = \left(\sum_{i=1}^{N} P_i (\log_e X_i)\right) \Big/ \left(\sum_{i=1}^{N} P_i\right)$$
9. The Gini coefficient: $$\left(\sum_{i=1}^{N} \sum_{j=1}^{N} P_i P_j \left| X_i - X_j \right|\right) \Big/ \left[2\left(\sum_{i=1}^{N} P_i\right)^2 \bar{X}_p\right]$$
10. The Theil Measure: $$\left(\sum_{i=1}^{N} P_i (X_i \log_e X_i - \bar{X}_p \log_e \bar{X}_p)\right) \Big/ \left(\bar{X}_p \sum_{i=1}^{N} P_i\right)$$
11. Atkinson's index ($E > ; E \neq 1$): $$\left[\left(\sum_{i=1}^{N} P_i (X_i / \bar{X}_p)^{1-E}\right) \Big/ \left(\sum_{i=1}^{N} P_i\right)\right]^{\frac{1}{1-E}}$$

Figure B-2

Value Judgments Inherent in 11 Revenue Disparity Measures

Value Judgment Questions	Measures				
	Range	Restricted Range	Federal Range Ratio	Relative Mean Deviation	McLoone Index
1. Are all children taken into account in the measure?	NO	NO	NO	YES	NO
2. Does the measure always show an improvement when revenues are transferred from one child to another lower in the distribution, without reversing the ranking of the children? (Such a transfer is often referred to as "mean preserving.")	NO	NO	NO	NO	NO
3. Does the measure always change when the revenues of each child are increased by a constant proportional amount? (Often referred to as degree of relative inequality aversion.)	YES	YES	NO	NO	NO
4. Does the measure always change when the revenues of each child are increased by a constant absolute amount? (Oten referred to as degree of absolute inequality aversion.)	NO	NO	YES	YES	YES
5. Does the measure record dollar changes at different levels of the distribution in the same way?	NO	NO	NO	NO	NO
6. Is the mean used as a basis of comparison?	NO	NO	NO	YES	NO
7. Is the median used as a basis of comparison?	NO	NO	NO	NO	YES
8. Are all levels compared to one another as a basis for comparison?	NO	NO	NO	NO	NO

*Not always true for transfers that are made within the high end of the distribution.

Source: Berne and Stiefel, "Concepts of Equity and Their Relationship to State School Finance Plans," *Journal of Education Finance*, Volume 5 (Fall, 1979).

Measures					
Variance	Coefficient of Variation	Standard Deviation of Logarithms	Gini Coefficient	Atkinson's Index (E>O)	Theil's Measure
YES	YES	YES	YES	YES	YES
YES	YES	ALMOST ALWAYS*	YES	YES	YES
YES	NO	NO	NO	NO	NO
NO	YES	YES	YES	YES	YES
YES	YES	NO	NO	NO	NO
YES	YES	YES	NO	YES	YES
NO	NO	NO	NO	NO	NO
NO	NO	NO	YES	NO	NO

Figure B-3

Spearman Rank Correlations for Pairs of Revenue Disparity Measures Using Data From 35 States in 1976

	Restricted Range	Federal Range Ratio	Relative Mean Deviation	McLoone Index	Variance	Coefficient of Variation	Standard Deviation of Logarithms	Gini Coefficient
Range	.447	.398	.491	.405	.605	.626	.529	.471
Restricted Range	X	.801	.776	.687	.878	.684	.754	.786
Federal Range Ratio		X	.870	.761	.613	.767	.786	.922
Relative Mean Deviation			X	.672	.751	.894	.870	.985
McCloone Index				X	.501	.491	.676	.705
Variance					X	.802	.766	.711
Coefficient of Variation						X	.805	.870
Standard Deviation of Logarithms							X	.859

Figure B-4

Formulas for Relationship Measures

The following symbols are used in a number of the formulas: P_i = Number of children in district i; N = Number of districts; R_i = Mean revenue per child in district i (dependent variable); $\bar{R}$ = Mean revenue per child for all children in the state; M = Median revenue per child for all children in the state; W_i = Property wealth per child in district i (independent variable); $\bar{W}$ = Mean property wealth per child for the entire state.

1. The simple correlation (SIM COPR): the Pearson correlation coefficient between R_i and W_i, where each is weighted by P_i.

2. The slope from the simple regression (SLOPE W): b_1 in the pupil weighted regression $R_i = a + b_1 W_i$.

3. The slope from the quadratic regression (SLOPE W2): $b_1 + 2b_2\bar{W}$ in the pupil weighted regression $R_i = a + b_1 W_i + b_2 W_i^2$.

4. The slope from the cubic regression (SLOPE W3): $b_1 + 2b_2\bar{W} + 3b_3\bar{W}^2$ in the pupil weighted regression $R_i = a + b_1 W_i + b_2 W_i^2 + b_3 W_i^3$.

5. The elasticity from the simple regression (ELAST W): $(\text{SLOPE W}) \times \left(\frac{\bar{W}}{\bar{R}}\right)$

6. The elasticity from the quadratic regression (ELAST W2): $(\text{SLOPE W2}) \times \left(\frac{\bar{W}}{\bar{R}}\right)$

7. The elasticity from the cubic regression (ELAST W3): $\text{SLOPE W3}) \times \left(\frac{\bar{W}}{\bar{R}}\right)$

Figure B-5

Value Judgments Inherent in Seven Relationship Measures

Value Judgments	Sim Corr	Slope W	Slope W2	Slope W3	Elast W	Elast W2	Elast W3
1. All children taken into account?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Increase in equity for σ mean preserving transfers?	Not Neces-sarily	Yes	Not Neces-sarily	Not Neces-sarily	Yes	Not Neces-sarily	Not Neces-sarily
3. Sensitive to equal additions to dependent?	No	No	No	No	Yes	Yes	Yes
4. Sensitive to equal percentage increases in dependent?	No	Yes	Yes	Yes	No	No	No
5. Sensitive to equal additions to independent?	No	No	No	No	Yes	Yes	Yes
6. Sensitive to equal percentage increases in independent?	No	Yes	Yes	Yes	No	No	No

Source: Berne and Stiefel, "Measuring the Equity of School Finance Policies: A Conceptual and Empirical Analysis," Graduate School of Public Administration, New York University, June 1979.

Figure B-6

Spearman Rank Correlations for Pairs of Relationship Measures Using Data From 32 States in 1976

	Slope W	Slope W2	Slope W3	Elast W	Elast W2	Elast W3
Simple Correlation	.398	.345	.299	.619	.510	.410
Slope W	X	.901	.908	.650	.510	.390
Slope W2		X	.923	.488	.576	.359
Slope W3			X	.532	.504	.514
Elast W				X	.824	.755
Elast W2					X	.778

Appendix C

This appendix consists of four tables that show how 35 states rank from most equitable to least equitable using the coefficient of variation and the McLoone Index (Table C-1), the restricted range and the federal range ratio (Table C-2), and the correlation between wealth and revenues and the elasticity between wealth and revenues (Table C-3) with data from 1975-76. The data in these tables are taken from Tables 1, 2 and 3 in the text.

Table C-1

Revenue Disparity Measures for 35 States in 1976, Ranked From Most Equitable (1) to Least Equitable (35)

McLoone Index			Coefficient of Variation		
Rank	State	Value	Rank	State	Value
1	New Mexico	.961	1	Louisiana	9.6
2	West Virginia	.951	2	Florida	9.8
3	North Carolina	.949	3	West Virginia	10.3
4	Florida	.947	4	North Carolina	10.8
5	Oklahoma	.942	5	Minnesota	12.5
6	Missouri Unified	.932	6	Rhode Island	13.6
7	Minnesota	.930	7	New Mexico	13.7
8	Mississippi	.926	8	Delaware	14.0
9	Idaho	.926	9	Wisconsin	14.2
10	Kentucky	.923	10	Mississippi	15.4
11	Maryland	.921	11	Idaho	15.4
12	Wyoming	.915	12	Maryland	15.7
13	Illinois Unified	.913	13	Indiana	16.2
14	Rhode Island	.911	14	Vermont	17.3
15	Massachusetts	.910	15	Connecticut	17.8
16	Louisiana	.906	16	South Dakota	17.9
17	Wisconsin	.901	17	Missouri Unified	18.2
18	New Hampshire	.895	18	Maine	18.3
19	Virginia	.892	19	Arkansas	18.8
20	Connecticut	.890	20	New Jersey	19.1
21	Arkansas	.888	21	Oregon	19.4
22	Nebraska	.886	22	Nebraska	20.7
23	Texas	.884	23	South Carolina	20.9
24	Indiana	.882	24	Oklahoma	21.3
25	Vermont	.880	25	Illinois Unified	21.5
26	Maine	.880	26	New Hampshire	22.1
27	Delaware	.879	27	Massachusetts	22.4
28	South Dakota	.874	28	Texas	22.5
29	New Jersey	.871	29	Kentucky	23.8
30	South Carolina	.868	30	Virginia	24.0
31	Tennessee	.864	31	Tennessee	24.2
32	Georgia	.835	32	New York	24.4
33	New York	.816	33	Wyoming	25.4
34	Oregon	.805	34	Georgia	33.6
35	Pennsylvania	.724	35	Pennsylvania	49.3

Table C-2

Revenue Disparity Measures For 35 States In 1976, Ranked From Most Equitable (1) to Least Equitable (35)

Restricted Range			Federal Range Ratio		
Rank	State	Value	Rank	State	Value
1	Louisiana	283	1	Florida	.31
2	West Virginia	313	2	Louisiana	.31
3	Oklahoma	333	3	West Virginia	.36
4	North Carolina	340	4	New Mexico	.37
5	New Mexico	353	5	North Carolina	.43
6	Idaho	353	6	Idaho	.46
7	Florida	360	7	Wisconsin	.48
8	Arkansas	428	8	Minnesota	.50
9	Mississippi	485	9	Oklahoma	.50
10	Missouri Unified	503	10	Delaware	.54
11	Tennessee	504	11	Missouri Unified	.57
12	New Hampshire	551	12	Rhode Island	.58
13	Minnesota	562	13	Maryland	.60
14	Rhode Island	574	14	New Hampshire	.61
15	South Dakota	585	15	Indiana	.70
16	Wisconsin	590	16	Arkansas	.70
17	Delaware	592	17	Vermont	.70
18	South Carolina	604	18	Virginia	.77
19	Maine	619	19	Illinois Unified	.78
20	Indiana	624	20	Mississippi	.79
21	Vermont	633	21	Connecticut	.80
22	Kentucky	651	22	Oregon	.80
23	Maryland	656	23	New Jersey	.85
24	Virginia	660	24	Maine	.86
25	Nebraska	716	25	Kentucky	.88
26	Illinois Unified	770	26	South Dakota	.88
27	Texas	776	27	Texas	.89
28	Connecticut	801	28	Nebraska	.93
29	Oregon	836	29	Tennessee	.94
30	New Jersey	840	30	Wyoming	.97
31	Georgia	1,015	31	New York	1.04
32	Pennsylvania	1,123	32	South Carolina	1.05
33	Wyoming	1,129	33	Massachusetts	1.10
34	Massachusetts	1,421	34	Georgia	2.76
35	New York	1,591	35	Pennsylvania	3.90

Table C-3

Measures That Assess Relationship Between Revenues And Wealth For 35 States in 1976, Ranked From Equitable (1) to Least Equitable (35)

Correlation Between Wealth and Revenues			Elasticity Between Wealth and Revenues		
Rank	State	Value	Rank	State	Value
1	Illinois Unified	.25	1	Maine	.04
2	Maine	.32	2	Massachusetts	.05
3	Louisiana	.37	3	Mississippi	.06
4	New Mexico	.37	4	Louisiana	.06
5	Minnesota	.41	5	New Mexico	.06
6	New Jersey	.41	6	Vermont	.11
7	Wisconsin	.44	7	Minnesota	.12
8	Rhode Island	.45	8	Texas	.13
9	Tennessee	.46	9	New Jersey	.14
10	West Virginia	.49	10	North Carolina	.15
11	Vermont	.49	11	Illinois Unified	.16
12	Delaware	.51	12	West Virginia	.17
13	New Hampshire	.53	13	Wisconsin	.17
14	South Carolina	.55	14	Florida	.19
15	North Carolina	.56	15	Idaho	.19
16	Indiana	.58	16	Nebraska	.19
17	Massachusetts	.62	17	New Hampshire	.20
18	Texas	.62	18	Connecticut	.20
19	Connecticut	.63	19	Rhode Island	.22
20	Idaho	.64	20	Indiana	.23
21	Nebraska	.67	21	Tennessee	.24
22	Oregon	.70	22	Delaware	.24
23	Maryland	.70	23	Oklahoma	.27
24	Virginia	.71	24	Wyoming	.28
25	South Dakota	.76	25	South Dakota	.29
26	Florida	.77	26	Arkansas	.33
27	Kentucky	.78	27	Oregon	.33
28	New York	.79	28	Maryland	.36
29	Mississippi	.79	29	Missouri Unified	.36
30	Arkansas	.81	30	South Carolina	.36
31	Missouri Unified	.81	31	Virginia	.38
32	Pennsylvania	.81	32	New York	.40
33	Oklahoma	.85	33	Kentucky	.48
34	Wyoming	.89	34	Georgia	.65
35	Georgia	.93	35	Pennsylvania	.98

Appendix D
Pupil Weights Used in Selected States

Weights for Various Educational Programs in Florida, 1975-76

Basic Programs	
Kindergarten and Grades 1, 2 and 3	1.234
Grades 4 through 9	1.00
Grades 10, 11 and 12	1.10
Special Programs for Exceptional Students	
Educable mentally retarded	2.30
Trainable mentally retarded	3.00
Physically handicapped	3.50
Physical and occupational therapy, part-time	6.00
Speech and hearing therapy, part-time	10.00
Deaf	4.00
Visually handicapped, part-time	10.00
Visually handicapped	3.50
Emotionally disturbed, part-time	7.50
Emotionally disturbed	3.70
Socially maladjusted	2.30
Specific learning disability, part-time	7.50
Specific learning disability	2.30
Gifted, part-time	3.00
Hospital and homebound, part-time	15.00
*Vocational-Technical Programs**	
Vocational Education I	4.26
Vocational Education II	2.64
Vocational Education III	2.18
Vocational Education IV	1.69
Vocational Education V	1.40
Vocational Education VI	1.17
Adult Education Programs	
Adult basic education and adult high school	1.28
Community service	0.675

*Vocational-technical programs are put into one of six categories depending upon the relative cost of providing the program. Most expensive are certain shop courses using a great deal of expensive equipment; least expensive are secretarial courses.

New Jersey Weightings for Categorical Aid Programs as Contained in the Public School Education Act of 1975 (N.J.S.A. 18A:7A-20)

Special Education Classes	*Additional Cost Factors*
Educable	0.53
Trainable	0.95
Orthopedically handicapped	1.27
Neurologically impaired	1.06
Perceptually impaired	0.85
Visually handicapped	1.91
Auditorially handicapped	1.38
Communication handicapped	1.06
Emotionally disturbed	1.27
Socially maladjusted	0.95
Chronically ill	0.85
Multiply handicapped	1.27

Other Classes and Services	
Approved private school tuition	Additional cost factor of the handicap plus 1.0
Supplementary and speech instruction	0.09 based on the number of pupils actually receiving such instruction in the prior school year
Bilingual education	0.16
State compensatory education	0.11
Home instruction	0.006 times the number of hours of instruction actually provided in the prior school year

The weighting system in Illinois is for compensatory education only. The weighting is related to the concentration of students eligible for federal ESEA Title I aid. The weighting is equal to 0.375 times the ratio of the district concentration to the state average concentration. The maximum additional weight is 0.75.

New York Weighting System

Category of Student	*Extra Weight*
Secondary 7-12	0.25
District educated handicapped	1.00
State compensatory education	0.25 for grades 1-6 students 0.15 for grades 7-12 students
Evening	0.50
Summer School	0.12

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